UNIVERSITY OF ALBERTA

LOW-BACK INJURIES IN ALBERTA HOME CARE NURSES

BY

KIN CHEUNG ©

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master of Nursing

FACULTY OF NURSING

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DEDICATION

This thesis is dedicated with deepest love and gratitude
to:

My Parents, Drs. Cheung & So
&
My Husband, Thuan Thach

With them, I have found
the meaning of love:

Someone
who makes you feel good about living,
who brings out the you who is joyful and giving ...

Something
that gives you a chance to be strong,
or trust in another to help you along ...

Somewhere
that you feel like you've been forever,
a place where you're growing and learning together ...

Abstract

Low-back injuries (LBIs) are an ergonomic hazard posed to workers in general and to nurses in particular. The unique unpredictable, uncontrollable, and uncertain home care working environment puts Home care nurses (HCNs) at risk of LBIs. The purpose of this study was to: (1) determine the incidence and reporting practices of HCNs in Alberta province regarding LBIs; (2) begin to ascertain HCNs' knowledge and attitudes regarding the prevention and follow-up of such injuries; and (3) investigate the nature of near-accidents/close calls of LBIs. Survey results from 400 Alberta HCNs indicated that lack of organizational resources and formalization for occupational health; driving on poor road conditions, pets, working alone, and untrained caregivers; and handling of materials, working heights, bed widths, lack of equipment, and work space all contribute to risks for LBIs among HCNs. The findings from this study can be used to assist nurse educators and managers to promote a healthier work environment.

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CHAPTER ONE

Introduction

Concerns have been raised by Alberta community-based nurses regarding occupational health and safety issues (Alberta Health, 1991). In an Alberta provincial survey conducted in February 1991, community-based nurses, including home care nurses (HCNs), identified that occupational health and safety issues were the second least satisfactory area in their work. Home care nurses were the second largest subset of participants in this study. Home care nurses generally were not satisfied in several areas of occupational health and safety. These included travel on the job (e.g. isolated areas and adverse weather), potential client violence, and the workplace physical environment. Also, they were not satisfied with employers' efforts made concerning a healthy working environment, providing health and safety information/training, and controlling health and safety hazards (Alberta Health, 1991).

Occupational hazards for health care workers are well documented and include biological, chemical, ergonomic, physical, psychological, reproductive, and safety categories (Brune & Edling, 1989; Charney & Schirmer, 1993; Emmett & Baetz, 1987; Lowenthal, 1994; Lunn & Waldron, 1991; Skillen, 1992, 1996; Triolo, 1989a, 1989b). Among these are low-back injuries (LBIs), which arise from ergonomic hazards, hazards posed to all workers in general and to nursing personnel in particular (Erdil, Dickerson, & Chaffin, 1994; Greenwood, 1986; Jensen, 1987a; Khalil, Asfour, Marchette, & Omachonu, 1987; Kumar, 1990a; Lagerlof & Broberg, 1989; Torma-Krajewski, 1987). In 1993, back injuries contributed to 29% of all work injuries in Canada (Statistics Canada, 1993). Back problems have attracted a lot of researchers' attention. Different approaches, such as epidemiological, biomechanical, physiological, and psychophysical, have been developed in the effort to control low-back problems (Kumar & Mital, 1992). However, Jensen (1987b) criticized a lack of consistent terminology in the study of back problems in nursing as well as in other occupational groups. Back injury and back pain have been used interchangeably. Moreover, the anatomical regions included in studies vary considerably. Some include the entire back, others are limited to the lower back (Jensen, 1987b).

Although LBIs are common among workers, the risk factors underlying the occurrence of occupational LBIs, particularly in nursing, have not been fully explored (Cohen-Mansfield, Culpepper, & Carter, 1996; Gagnon, Sicard, & Sirois, 1986; Venning, Walter, & Stitt, 1987). This may be partly due to the common practice of post-injury investigation in the workplace, which results in a failure to recognize the near-accidents/close calls associated with LBIs. In fact, near-accidents/close calls, which are incidents with no visible injury or damage, are the precursors of many serious human injuries or property damage (Bird & Germain, 1986).

In contrast with the manufacturing industry where the product is inanimate, the health care industry is more difficult to study regarding the problem of LBIs because the objects being handled are people (Harvey & Lyons, 1993; Roth, Ciecka, Wood, & Taylor, 1993). The problem of lifting or transferring a client (human load) is not as straightforward as overcoming a heavy inanimate load with compact size and shape. Some clients are unpredictable, combative, and unco-operative, and may suddenly resist movement, pinch, or bite; this unpredictable condition may throw the nurse and client off balance during a lift or transfer (Garg & Owen, 1992; Garg, Owen, Beller, & Banaag, 1991a, 1991b; Greenwood, 1986; Harvey & Lyons, 1993; Roth et al., 1993). Two studies done by Owen (1987), from a sample of hospital registered nurses, suggested that characteristics such as the client's weight, behaviors, and condition were important contributing factors for back injuries.

Finally, the old maxim "prevention is better than cure" has never lost its relevance and is becoming more meaningful than ever with respect to LBIs. Nonetheless, few managers in the health care industry have established high quality occupational services compared with their counterparts in other major industries (Emmett & Baetz, 1987). Indeed, the purpose of occupational health is to try to achieve and maintain a safe and healthy working environment for all workers (Emmett & Baetz, 1987; Harrigton & Gill, 1987; Hoffman & Gray, 1994). Numerous LBI studies have been conducted in the manufacturing industry (the goods-producing sector of the economy) (Greenwood, 1986). These research findings on LBIs in the male-dominated manufacturing industry may not be applicable to the female-dominated nursing profession. It is generally agreed that men and women are physically different in terms of strength. In terms of body strength, women are 40% to 75% weaker than men in upper body strength, and 5% to 30% weaker in lower body strength (Falkel, Sawka, Levine, Pimental, & Pandolf, 1986; Wilmore & Costill, 1988). Kumar and Garand (1992) also found that gender affected postural strength. The standard postural strength of females ranged between 45% to 49% that of males. Furthermore, studies have shown that anatomically, females have narrower shoulders and wider hips than their male counterparts. Also, women proportionally have shorter legs and arms than men (Mackay & Bishop, 1984).

Although there are nursing studies related to LBIs, they have been conducted in acute and chronic care institutional settings. Consequently, these research findings on

LBIs may not be applicable to community-based nurses, especially HCNs. Home care has been defined as "the provision of equipment and services to the patient in the home for the purpose of restoring and maintaining his or her maximal level of comfort, function, and health" (AMA Council on Scientific Affairs, 1990, p. 1241). This definition shows that the only difference between hospital-based nursing and home care nursing is the setting for practice. Obviously, clients' homes are the setting for home care nursing practice (Humphery, 1988), whereas institutions are for hospital-based nursing practice. Home care nurses have to work in unfamiliar surroundings and interact with the clients and their family in the home (Ceslowitz & Loreti, 1991). Comparatively, HCNs work in unpredictable, uncontrollable, and uncertain environments which are frequently in direct contrast with the controlled, standardized, and well-equipped environments of institutions (Ceslowitz & Loreti, 1991; Marvan-Hyam, 1986; Smith & White, 1993). The data related to motor vehicle accidents and slips and falls outside or within a client's home deserve a great deal of concern in the home care setting as they can be a cause of LBIs besides lifting/transferring, which are identified as the major risk factors in institutional settings. In addition, HCNs visit a large number of terminally ill clients (Marvan-Hyam, 1986). Currently, owing to health care reform, more clients are discharged from the hospital "sicker and quicker" (Humphery, 1988, p. 305), and they require home care services. As a result, home care services have become technically complex, due in part to the ability to deliver advanced technology such as dialysis, chemotherapy, intravenous therapy, ventilatory support, and other acute care in the home (AMA Council on Scientific Affairs, 1990). Hence, HCNs must assist the clients and their family with special physical and psychological needs. However, small bedrooms crammed with heavy furniture, nonadjustable beds; small bathrooms with no room for any equipment; and absence of mechanical lifting devices are all common to settings in which HCNs work (Hempel, 1993). "While many old hospital buildings are not conducive to good handling practices, patients' home are usually even less so" (Hempel, 1993, p. 40). Thus, LBIs could be more serious in the home care setting because of limited space and shortage of mechanical lifting devices.

Among community-based services, home care is the most rapidly growing area under health care reform. Restructuring of the health care system in Alberta has resulted in the formation of seventeen Regional Health Authorities (RHAs). Home care services are one of the core health services in each region (Oberg & Wagner, 1994). That means HCNs work in both rural and urban communities throughout the province. Also, changes in the health care system are creating a shift from hospital to home care services. However, great emphasis has been made on how to maintain client and not care provider safety in the field of home care. Protecting HCNs means the difference between delivering quality care and no care at all. One consequence of this lack of attention to care providers is a dearth of knowledge about LBIs among HCNs. Effective LBI prevention programs can only be developed and implemented if a sound understanding is acquired of the incidence of and risk factors/behaviors for LBIs among HCNs.

Purpose of the Study

The purpose of this study was to describe LBIs in Alberta HCNs. Low-back injuries are defined as an occupational injury in the area between the lower posterior costal margins and gluteal folds (Walsh, Varnes, Osmond, Styles, & Coggon, 1989), and they are triggered by a specific event at work. Specifically, the research questions were:

(1) What is the incidence of LBIs among Alberta HCNs?

(2) What are the reporting practices for LBIs among Alberta HCNs?

(3) What are the most common risk factors/behaviors for LBIs among Alberta HCNs?

(4) What is the nature of near-accidents/close calls for Alberta HCNs?

(5) What organizational resources do Alberta HCNs have in their agencies for the prevention and/or follow-up of LBIs?

(6) What is the relationship between risk factors/behaviors and reporting practices for LBIs among Alberta HCNs?

(7) What is the relationship between the organizational resources of Alberta home care agencies and the reporting practices among Alberta HCNs for LBIs?

An Ecology Model was selected to guide the literature review, research method, and questionnaire development. This model integrates personal, workplace, and environmental factors together rather than only focusing on one aspect. For instance, the lifestyle approach ignores the influence of social factors on health and disease and it promotes a victim-blaming ideology (McLeroy, Bibeau, Steckler, & Glanz, 1988). The workplace approach ignores the power of personal perceptions. Focusing on both personal and workplace factors is not enough because unexpected factors, such as weather, in the environment would interfere with the susceptibility of certain occupational injuries. Ecology Models assume that "appropriate changes in the social environment will produce changes in individuals, and that the support of individuals in the population is essential for implementing environmental changes" (McLeroy et al., 1988, p. 351).

Significance of the Study

Alberta HCNs have expressed dissatisfaction on the issue of occupational health and safety (Alberta Health, 1991). Successful occupational health and safety programs, however, need active administrative support (Nearing, 1994). Low-back injury is one of the oldest ergonomic hazards in all occupations (Andersson, Fine, & Silverstein, 1995). This is an especially important period in the home care field since it is growing at a rapid rate; now is the time for home care agencies to give attention to the issue of occupational LBIs. This research contributes to an increased awareness regarding the incidence of LBIs and risk factors/behaviors of LBIs among Alberta HCNs. Study results also raise attention to the importance of reporting LBIs and near-accidents/close calls. Thus, a comprehensive ergonomics program can be developed based on knowledge of unsafe practices that contribute to LBIs among Alberta HCNs. Consequently, findings from this study can assist educators and managers to plan for promoting healthier working environments.

This study not only contributes to an increased awareness of the issue of LBIs to management HCNs, but also to staff HCNs. As health care professionals, nurses may strongly consider the care of the client to be so important that any focus upon changing client care practices in order to reduce their own discomfort level would be ethically, professionally, and socially unacceptable in the context of a "helping" profession (Harber et al., 1988). This study assists HCNs, a neglected sector of health professionals, to assess their own work environments and to incorporate work-oriented prevention education into their professional practice. Only when HCNs know how to take care of their own occupational health can they deliver quality client care.

Results of this study can also be used to inform the public of the need to focus on occupational hazards among HCNs. Harvey and Lyons (1993) pointed out that clients probably do not consider themselves to be part of the health care operation system, in the same way that furniture is part of a warehouse. As a matter of fact, clients' behaviors, such as co-operation, play a crucial role in occupational LBIs among nursing personnel. For instance, clients may be reluctant to exchange the marital bed for an adjustable one, even if there is room (Hempel, 1993). Hence, findings of this study can increase clients' awareness of their influences on preventing LBIs among HCNs.

Finally, this study provides a starting point for more in-depth nursing research on LBIs among HCNs. Because of the descriptive nature of this study, "the data may lead to suggestions of hypotheses for further study" (Brink & Wood, 1994, p. 107). The results of this study provide detailed information on the variables under study: incidence, risk factors/behaviors, organizational resources, reporting practices, and nature of near-accidents/close calls. Based upon this information, future research may be undertaken to predict the relationship among these variables and to investigate near-accidents/close calls.

CHAPTER TWO

Literature Review

The review of the literature is divided into two major sections. The first section illustrates the synthesis of the guiding theoretical concepts from the reading of the conceptual literature. The second section is a critique of the data-based literature on low-back injuries (LBIs) in industrial and health care settings. The chapter concludes with the argument that, theoretically and empirically, there was an urgent need to look at the incidence, risk factors/behaviors, organizational resources, reporting practices, and nature of near-accidents/close calls for LBIs among home care nurses (HCNs).

Ecological Model

An Ecological Model was used to guide this study. This is a systems model, sometimes referred to as a transactional model (Endler, 1976; Pervin, 1968) because of its reciprocal causation between individual and environment. An ecological perspective pays direct attention to behavior and both its individual and environmental determinants (McLeroy et al., 1988). The need to have an "ecological" approach is supported by the statement given by the World Health Organization “In health, we view, for society and man, a meeting point between the ‘inner environment’ and the external environment, the integrating of the biologos in which life operates” (Day & Lambo, 1990, p. 3).

The Ecology Model was first proposed by Urie Brofenbrenner (1977, 1979). Brofenbrenner (1977, 1979) views behavior as being affected by, and affecting, multiple levels of influences. He divides environmental influences on behavior into four levels. The first level is the microsystem which refers to interpersonal interaction. The second level is the mesosystem which is the system of microsystems. The third level is the exosystem which refers to the larger social system. The last level is the macrosystem which refers to cultural beliefs and values. According to Brofenbrenner's model, each of these subsystems affects behavior, and the subsystems themselves may change as their members are replaced or altered.

Brofenbrenner's Ecology Model has been criticized as lacking sufficient ability to formulate specific problems and/or identify appropriate interventions (McLeroy et al., 1988). By modifying Brofenbrenner's model, McLeroy et al. (1988) develop a health promotion Ecology Model which views patterns of behavior of individuals or aggregates as the outcomes of interests, and behavior as determined by intrapersonal factors, interpersonal processes, organizational factors, community factors, and public policy. An implicit assumption of these five levels of analysis is that health promotion interventions are based on beliefs, understandings, and theories of determinants of behavior, and that analysis of these levels reflects the range of strategies currently available for health promotion programming.

One of the advantages of McLeroy et al.'s (1988) modified Ecology Model is its flexibility. Addressing all levels of the model is not necessary. In addition, other levels of analysis could be employed for understanding causes and potential interventions for modifying health related behavior change. "Choices in where to intervene will be largely a function of program resources, the mission and goals of the host organization, and the theoretical model guiding the intervention" (McLeroy et al., 1988, p. 368). The most important feature of an ecological perspective is that "it broadens our outlook to include environmental interventions that may support the behavior change process" (McLeroy et al., 1988, p. 368). Furthermore, Conrad, Balch, Reichlet, Muran, and Oh (1994) adapted

McLeroy et al.'s Ecology Model to identify the risk factors for musculoskeletal injuries in 14 fire departments in suburban Illinois. Accordingly, they viewed behavior as determined by three factors: individual worker, workplace, and environment.

A variation on Broffenbrenner's model is used as the conceptual framework for this research study, and borrows from the work of McLeroy et al. (1988), Neuman (1995), and Conrad et al. (1994). In this model (Appendix A), LBI is viewed as being determined by both individual factors and factors beyond the individual's control, in this case the organization and the environment in which home care services occur:

(1) individual factors - characteristics of the individual such as age, education, knowledge, perceptions, skills, beliefs, illness, etc.

(2) organizational factors - organizational back program resources such as written policy or procedure, orientation, ongoing inservice, etc.

(3) environmental factors - environmental influences such as clients, clients' homes, nurses' offices, unexpected events, etc.

The following discussion reviews some of the processes operating at each of these levels of analysis, how they affect health-related behaviors, and what potential health promotion interventions may be employed. Research questions will be discussed and formulated at each level of analysis.

Individual Factors

The epidemiological transition from infectious to chronic disease as the leading cause of death has raised societal interest in the prevention of disability and death by changing individual behaviors (McLeroy et al., 1988), such as smoking cessation, safer sex, weight control, increased fitness, and injury prevention in the workplace. Many of these individual behavior change models are adapted from psychology (Green, 1984). Psychological models which have been used to explain health-related behavior include: value-expectancy theories and attitude change models, such as the health belief model (Pender, 1987); social learning theory (Bandura, 1986; Stretcher, Devellis, Becker, & Rosenstock, 1986); models of stress and coping; personality theories (Carver & Humphries, 1982; Kobasa, 1982; Janis, 1984); and developmental models (Santrock, 1992).

The purpose of these models is to change individuals rather than to modify the societal environment. For instance, teenagers are taught to resist interpersonal influences related to sex, rather than attempting to modify the norms and values that teenagers' cliques or networks have about sex. "These interventions may reflect the implicit assumption that the proximal causes of behavior and/or mechanisms for producing behavioral changes lie within the individual, rather than in the societal environment" (McLeroy et al., 1988, p. 356).

One of the criticisms received by the proponents of individually-oriented behavior change strategies comes from victim-blaming ideology. Tesh (1981) criticizes that "the life-style hypothesis approaches disease as though ill health is the result of personal failure. It dismisses with a wave of a hand most environmental toxins and it ignores the crucial connection between individual behavior and social norms and rewards. It is, in fact, a victim-blaming approach to disease" (p. 379). Ironically, an individual behavior change approach, in turn, hinders behavior change due to its victim-blaming ideology. For example, threat of disciplinary action has been identified as a factor in not reporting needlestick injury in the workplace (Bailey, 1990). Thus, Sloan (1987) comments that there is a risk for health promotion activities which neglect the social causation of disease by emphasizing individuals and their choices.

Although the lifestyle approach has received criticism, it is still one of the inevitable components in a health promotion program. Environmental factors may affect individual workers, but if the worker does not perceive susceptibility of certain occupational injuries or illnesses, he/she will not be motivated to change risky behaviors. For instance, strategies for preventing LBIs have been focused heavily on education and training (e.g., lifting techniques for client transfer). Unfortunately, there is no scientific evidence that it alone is effective in reducing LBIs, especially in nursing practice (Brown, 1972; Buckle, 1982; Dehlin, Henderud, Horal, 1976; Snook, Campanelli, & Hart, 1978; Stubbs, Buckle, Hudson, & Rivers, 1983; Venning, 1988; Wood, 1987). Guidelines for manual lifting are available for reference ("U.S. Department," 1981). These government guidelines and research studies ignore the employees' roles in LBIs. They focus on the lifting techniques. They do not investigate the employees' perception of LBIs. Do nurses realize their risk for LBIs? Do they perceive any threat of LBIs? Do they perceive a susceptibility to LBIs? These questions might be answered by applying the Health Belief Model (Pender, 1987) to the study. This model focus on individual perceptions. Pender (1987) states that "an individual's own estimated subjective probability that he or she will encounter a specific health problem constitutes perceived susceptibility" (p. 48). A worker with high perceived susceptibility would more likely take recommended preventive health action. In other words, theoretically, if nurses perceive that they are susceptible to LBIs in their workplace, they would probably use proper lifting techniques.

McLeroy et al. (1988) also suggest that active involvement of the target population in problem identification, selection of appropriate intervention, implementation, and evaluation would minimize the problems of coercion and paternalism. Based upon this suggestion, risky behaviors of LBIs in home care setting should be collected from HCNs. By ignoring HCNs' point of view of LBIs, LBI prevention programs based on management speculation will not be appropriate, and failure is likely the end result. The target population of this research study, therefore, is all Alberta Home Care Nurses.

In summary, the lifestyle approach proposes that nurses' personal perceptions are one of the factors which determine the success of the LBI prevention programs. Questions derived from this approach are: (1) Do HCNs consider the risk of LBI a problem in home care? (2) How do HCNs perceive their own risks associated with LBIs? (2) What is HCNs' knowledge associated with LBIs? (3) Why do HCNs not report some LBIs to their agencies? (4) Why do HCNs not use a lift/transfer device? How often do HCNs use biomechanical techniques for preventing LBIs?

Organizational Factors

Implicit in the proceeding discussion is the assumption that a lifestyle approach to worksite health promotion may yield only marginal improvements in workers' health behavior. Although personal factors are essential, the design of a workplace is also another inevitable component in a health promotion program. Skillen (1996) emphasized that organizational factors are inseparable from occupational hazards at work. Specific areas of concerns in the workplace include: the importance of organizational policy and procedure in reducing workplace injuries; the importance of injury reporting systems in facilitating the rehabilitation process; and the importance of orientation and inservice education for reducing occupational injuries (Skillen, 1992, 1996).

Organizational structures and processes have substantial influence on the health and health-related behaviors of individual workers. Biological, chemical, ergonomic, physical, psychological, reproductive, and safety hazards have been identified in the community health nursing workplace (Skillen, 1992, 1996). Injuries and accidents are not unusual in the workplace. In addition, the pace of work, excessive workloads, shift work, poor relationships with supervisors, and communication problems are identified as workplace hazards which have subsequent health effects on individual workers (Holt, 1982).

As a context for health promotion activities and programs, organizations provide the opportunity to build group norms and values, particularly through individual work groups and socialization into organizational cultures (Van Maanen & Barley, 1985). In addition, workers can have social support for behavior changes in the organizations, particularly if the new behavior is a group norm. For instance, occupational health and safety policies and procedures provide safety guidelines for workers. However, existing policies and procedures in organizations do not mean the worker will understand how to handle safety issues. The administrator or supervisor should develop a group norm to read and understand the policy and procedure. Wright (1993) states that the goal of reading the policy and procedure is to have workers become familiar with the safety policy so that they can handle the situation anywhere and at any time. She also suggests that, at the very least, having workers read the policy and procedure would make them aware that it exists.

However, like the lifestyle approach, the organizational approach in health promotion has not been without its criticism. Some critics accused proponents of organizational interventions of promoting coercion, and paternalism by invasion of privacy (Crocker, 1987; McLeroy, Gottlieb, & Burdine, 1987). For example, policy approaches, such as banning smoking in the workplace, may be viewed as restricting individual rights and freedoms. Preemployment health examination may be subtly coercive when the results of the examination are used for job selection.

Questions arising from the workplace approach are: (1) Are there any resources in home care agencies that pertain to prevention and/or follow-up of LBIs? (2) Are there any orientation, inservice, policies and procedures concerning LBIs in the home care agencies?

Environmental Factors

An ecological perspective implies reciprocal causation among the interacting parts within the system, such as individual, organization, and the environment (Conrad et al., 1994; McLeroy et al., 1988; Neuman, 1995). Consideration of the environment is critical, since health and wellness vary as the needs, predisposition, perception, and goals of all identifiable systems; environment is that viable arena that has relevance for the life space of the system. Environment has been generally conceptualized as all factors affecting and affected by the system (Neuman, 1995). The nurse may influence or be influenced by environmental factors either positively or negatively, at any given point in time. Input, output, and feedback between the nurse and the environment is of a circular nature; nurse and environment have a reciprocal relationship, the outcome of which is corrective or regulative for the system (Neuman, 1995).

Consideration of environment is crucial. This gives birth to the concept of ergonomics. Sluchak (1992) defined it as "the study of human behavioral and biological characteristics for the appropriate design of the living and working environment" (p. 105). Ergonomics is the adaptation of the working environment to the employee to minimize human error, to maximize human safety, health, efficiency, and to maximize organization quality, reliability and productivity (Bullock, 1990; Harrington & Gill, 1987; Rodgers, 1992; Sluchak, 1992; Schroeder & Gaddy, 1987; Thompson, 1990; Travers, 1992).

Ergonomics was first introduced into the literature by a Polish educator and scientist named Wojciech Jastrzebkowski (Eastman-Kodak, 1983). However, ergonomics was not totally accepted in its current context until 1950 by K.F.H. Murrell (Sluchak, 1992). It was during the wartime that ergonomics first achieved the status of a recognized discipline. Within the military, experienced pilots crashed their aircraft on take off; bombs were dropped on wrong targets; and submarine operators failed to detect enemy ships or mistakenly attacked marine life. Among these accidents, investigators often found that the equipment had functioned reliably and that operators were among the most qualified. In many cases, however, it was recognized that accidents were due to the demands of operating the equipment which exceeded the human expectations and ability to cope with them (Sluchak, 1992). Following the war, ergonomics research was widely pursued to build the knowledge base about humans and their relationship to the working environment. Paul M. Fitts, Franklyn V. Taylor, and Alponse Chapanis established their reputations as founders of the human factors movement in the United States (Sluchak, 1992). The field of ergonomics expanded rapidly during the 1950s, and now plays a crucial role in the prevention of occupational accidents.

Ergonomics has two distinguishing features - an interdisciplinary and systems approach. Ergonomics is often called a multidisciplinary activity because it involves a contribution from many disciplines: ergonomics, psychology, life sciences, medicine, engineering, and personnel management. Each discipline brings its own theoretical perspective to the field, which contributes to theoretical fragmentation (Skillen, 1992). A variety of knowledge is required and must be applied within the sphere of practical operation of industry. The willingness to use knowledge from other fields permits the ergonomists to take a border systems perspective of an occupational setting. However, in reality, multiple disciplines create lack of clarity about who is accountable for driving ergonomic strategies in the organization. Is it the responsibility of the worker, manager, industrial hygienist, facilities organization, engineering staff, physician, or the occupational health nurse? Or is it best achieved only by a combination of all of these skill sets working together on a multidisciplinary team? (Travers, 1992).

There are five interacting components in the system (Appendix B): human, tool, task, workstation, and environment (Sluchak, 1992). Human is at the center of the system. Immediately affecting the human are the tool, task, and workstation components. Lastly, the all-encompassing environment consists of physical factors and other managerial/operational considerations which may have a direct or indirect influence on the human or the other components. For example, in a home care setting where back injuries are a concern, it is insufficient to concentrate on nurse factors only (e.g. physical conditioning, training, protective equipment, knowledge, education, job satisfaction, and anthropometry). The investigator must take a broader view of the situation and evaluate the individual effects of the task (lifting, twisting, bending, assessment, dressing change, and driving); tools (lift/transfer device, car, orientation, training, and knowledge); workstation (working height, bed width, furniture, seating, work surface, and fixtures); and environment (noise, lighting, temperature, weather, clients, legal regulations, management attitude toward workers, and pressure on workers to produce). This ergonomics illustration provides the concluding idea of the Ecology Model.

Questions arising from the concept of ergonomics are: (1) How seriously do environmental factors in clients' homes and/or nurses' office affect the occurrence of LBIs? (2) How seriously do client factors affect the occurrence of LBIs? (3) In what situations do work-related near-accident/close calls for a LBI occur? (4) Are there any uncontrollable situational factors that contribute to the occurrence of LBI? (5) Do HCNs work overtime? (6) Are HCNs satisfied with their current job? (7) Do HCNs consider their job stressful?

In summary, the Ecology Model was used to assist in developing the survey questionnaire of this study. A review of the literature confirmed that LBI is the major occupational injury among nursing professionals in institutional settings. However, little research has been done in home care settings. Therefore, the number of reported and unreported LBIs was sought to ascertain the severity of the problem in HCNs. How many LBIs have HCNs had in the preceding year? How many LBIs did HCNs report to their home care agencies? How many LBIs did HCNs not report to their home care agencies?

Incidence of Low-Back Injuries

Incidence of Occupational LBIs in General

There are few statistical data specifically on the incidence of LBIs in Canada. The only reliable source for identifying occupational injuries and illness is administrative data on claims to the Workers' Compensation Board (WCB). These WCB statistical data may contribute to the identification of possible hazards encountered by workers. Back injuries have been identified as the major hazard in the workplace (Alberta Labour, 1994b; Haggar-Guenette & Proulx, 1992; Statistics Canada, 1993), particularly those involving a lot of manual handling of materials (e.g. warehousing) or people (e.g. hospitals) (Alberta Labour, 1994b). In Canada, work-related injuries started to decline in 1990; back injuries, however, which contribute to 29% of all injuries have remained practically unchanged (Statistics Canada, 1993). Moreover, in 1993, 50% of all lost-time injuries, by part of body, were to the back. In 1993, there were 122,471 back injuries in Canada at work (Statistics Canada, 1993). In Alberta, there were 17,826 back injuries which accounted for 19.1% of all accident claims at work (M. Ng, personal communication, May 17, 1995) (Appendix C). Starting only in 1990, the category of, "Part of Back Injured", has been coded by the Alberta WCB. Among the categories, lumbar spine, sacrum and coccyx injuries are the closest to the definition of LBI for this study. From 1990-1992, lumbar spine injuries, which contribute 32.6% of all back injuries, are the highest percentage of back injury claims at work (Alberta Labour, 1994a). Sacrum and coccyx injuries contribute 2.6% of all back injuries (Alberta Labour, 1994a). Thus, taken together, this descriptive information about lost-time injuries provides a very clear picture, that is, LBIs are a common occupational hazard.

Incidence of LBIs in Nursing

Among occupations, nursing personnel such as registered nurses (RNs), licensed practical nurses (LPNs), and nursing aides (NAs) are classified as a high risk group for back injuries (Alberta Labour, 1994b; Haggar-Guenette & Proulx, 1992; Kumar, 1990; Troup, 1989). There is a general belief that NAs have the highest risk for back injuries as compared to other nursing personnel (Cohen-Mansfield et al., 1996; Gagnon et al., 1986; Lagerlof & Broberg, 1989; Owen & Garg, 1991; Personick, 1990). However, one study found that there were no significant differences in either the frequency of occurrence of back injury or the severity of injuries among RN, LPN, and NA positions (Garrett, Siniser, & Banks, 1992). Also, a report of back injuries from Alberta Labour (1994a) indicated that there was no significant difference in the number of back claims between NAs and RNs for the period of 1988 to 1992. Statistics showed that 46.6% of the back claims were sustained by NAs, and 51.3% by RNs (Alberta Labour, 1994a). The incidence data for nursing personnel in Alberta WCB are based on reports from acute care facilities and extended care facilities. In acute care facilities, nursing personnel account for almost 50% of all lost-time claims per year; in extended care facilities, nursing personnel account for 60% (Harvey & Lyons, 1993). In 1991, among these claims, other persons (64%) were the source of injury; lifting and other overexertion activities (65%) were the incident type; and sprains and strains (75%) were the injury type. Furthermore, 50% of all these lost-time injuries were to the back. These characteristics of time-loss WCB claims made by nursing personnel demonstrate that back strains while handling clients are the major hazard of the health industry. Although the incidence data for HCNs in Canada are not available, the problem of LBIs may be magnified because of their uncertain, unpredictable, and uncontrollable working environments.

However, caution must be taken when analyzing the statistical data on reported LBIs. Workers' Compensation Board data have been criticized as inadequate for spotting workplace hazards. These data only include accidents involving human injury or material damage (Bird & Germain, 1986; Lees & Laundry, 1989; Reason, 1991; van der Schaaf, 1991), and cover only 80% of the workforce. Lees and Laundry (1989) pointed out that understanding the causes of accidents will be limited if only incidents which produce injury are studied, because injury is only the tip of the iceberg (Bird & Germain, 1986). In 1969, a landmark safety study of industrial accidents revealed that, for every reported major injury (resulting in death, disability, lost time or medical treatment), there were: (1) 10 reported minor injuries, (2) 30 property damage accidents, and (3) 600 incidents with no visible injury or damage (Bird & Germain, 1986). This last category is usually referred to in the literature as near-misses, near-accidents/close calls, critical incidents, potential major injuries, and potential accidents (Lees & Laundry, 1989). There is no consensus on the use of the term. Thus, for the purpose of this study, the term near-accidents/close calls (Bird & Germain, 1986) will be used. The sequence of events which leads to a major accident is like a series of near accidents that fall onto one another like dominoes. In referring to the 1-10-30-600 ratio, it is clear "how foolish it is to direct our major effort at the relatively few events resulting in serious or disabling injury when there are so many significant opportunities that provide a much larger basis for more effective control of total accident losses" (Bird & Germain, 1986, p. 21).

Furthermore, these injury data underestimate the true number of LBIs (Agnew, 1987; Harber et al., 1985). First, injured employees may choose not to report the incidents. The reasons an injury is not reported may include factors such as lack of perceived severity of the accident, threat of disciplinary action, lack of effective treatment, guilt about non-compliance with procedures, and unclear reporting procedures (Levy & Wegman, 1995). Second, WCB data cover only losses due to work- related injury or disease. These data are restricted by the propensity to make a claim to the WCB, and the WCB's acceptance of the claim as work-related (Harvey & Lyons, 1993). Third, WCB data are incomplete because one fifth of the workforce in Alberta is not covered by the WCB (Alleyne, Dufresne, Kanji, & Reesal, 1989). Finally, underestimation of the incidence of LBIs based on formal reports might be more pronounced for health care workers than others, as they have access to informal consultation from health care colleagues and may tend to treat themselves (Agnew, 1987; Garg & Owen, 1992; Harber et al., 1985). Thus, the actual number of LBIs may be higher than the injury data shown.

Incidence of LBIs in HCNs

There is a scarcity of literature on the unique work hazards of LBIs among HCNs. Owing to trends to reduce hospitalization stay, the role of HCNs has become increasingly important. More research related to HCNs emerged in the 1990s. Some are related to HCNs' job satisfaction (Beck-Friis, Strang, & Sjoden, 1991; Curreri, Gilley, Faulk, & Swansburg, 1985; Hood & Smith, 1994; Juhl, Dunkin, Stratton, Geller, & Ludtke, 1993; Shuster, 1992); and some related to occupational health (Bittel, 1986; Myers, Jensen, Nestor, & Rattiner, 1993; Nadwairski, 1992; Rozelle, 1992; Skarplik, 1988; Smith & White, 1993; Stephany, 1993). A review of the literature uncovered one British (Skarplik, 1988) and two American (Myers et al., 1993; Smith & White, 1993) research studies directly or indirectly related to LBIs among HCNs, but no Canadian study.

Skarplik (1988) conducted a small scale survey to find out the extent of back injury among the community nursing staff in Oxford, London. Twenty two of the 39 nurses who returned the questionnaire reported suffering from back, neck or shoulder pain in the last year. Among those, 14 community nurses indicated that they had back injuries mainly due to lifting clients at home. Study results suggested that 36% community nurses experienced work-related back injuries. This astonishing suggestion has to be viewed with caution because of the small sample. However, this study implicated the need for more research on the problem of work-related back injuries among community nurses.

Smith and White (1993) conducted a survey study of 198 directors of home health care agencies in counties of Northern California, from the northern state border to counties south of the greater San Francisco Bay area. The purpose of the study was to assess (1) the nature of work performed by home health care workers; (2) the nature of occupational health programs; (3) the most common occupational injuries or illness in the previous year (July 1990 to June 1991); and (4) policies and educational programs in a number of quality assurance areas, including protection from back injuries.

The results showed that home health care workers were at risk for LBIs. LBIs contributed 45.1% (n=23) of overall reported injuries in a one year period. Needlestick and musculoskeletal injuries (other than back) each contributed 13.7% (n=7); auto accidents were 7.8% (n=4); infection/exposures (other than needlestick) were 5.9% (n=3); and falls were 3.9% (n=2). Although LBIs were the predominant injuries, only 82.5% of the agencies had formal written policy on back care protection and lifting, and 86% provided education/training on the subject. Smith and White (1993) also found that 46.5% of occupational health programs were not in-house. That means home care employees could not get the services they wanted on-site. They had to make appointments and travel certain miles to get the services. It was an inconvenience which could be a barrier for employee seeking help from occupational health experts. In addition, study results indicated that home care services have become technologically complex; the services exposed home care workers to the same occupational health hazards as those in hospitals.

Interpretation of this study has to be careful because of the low response rate of 33.5% (n=58). This study includes not only Registered Nurses (RNs), but also nursing aides (NAs). The ratio of registered nurses and nursing aides is not clear. Nevertheless, this study illustrates that there is a need to study LBIs in home care nurses because of the high LBI incidence rate, lack of organizational resources, and high-technology working environment.

Myers et al. (1993) conducted a LBI study among home health aides (HHAs) compared with hospital nursing aides (NAs) in the Baltimore-Washington area. Data were collected from all incident reports of LBI during 1984-1986 among NAs at one large hospital and HHAs at the two largest home health care agencies in the area. Results showed that HHAs had a higher incidence than NAs, 56 among the HHAs and 35 by the NAs. The average annual rate of LBIs among HHAs, 15.4 per 100 FTEs, was significantly higher than the rate for hospital NAs, 5.9 per 100 FTEs ($p<0.001$). Contributing factors identified were: working alone (88% among HHAs and 39% among NAs), lifting/pushing/pulling activities (over 50% for each group), activities involving patient's beds (40% for each group), and lifting without equipment (80% among HHAs and 75% among NAs). Specific activities reported at the time of injury were: moving patient up in bed (21% among HHAs and 11% among NAs), helping patient in/out bed (11% among HHAs and 6% among NAs), and helping patients in/out of chair (9% among HHAs and 3% among NAs). Unique risk factors identified in HHAs included driving their auto to patient's home, slipping without falling, making beds, and helping patient in /out of tub.

These study results suggest that home care workers have a higher LBI incident rate than health care workers in the hospital settings due to the unique working environments. HCNs face the same risk factors for LBIs as HHAs, such as driving, working alone, lifting without equipment, and moving patients in bed. Garrett et al. (1992) found that there was no significant difference in either the frequency of occurrence of back injury or the severity of injuries among RN, LPN, and NA positions.

Furthermore, several studies indicated that HCNs face unique occupational hazards which would be contributing factors for LBIs. Stephany (1993) conducted a simple survey in four home healthcare facilities in the San Francisco Bay area. Home care nurses were asked to (1) list health hazards that were part of their job, and (2) suggest ways to alleviate/eradicate those concerns. Personal safety, both on the road and in patients' homes, was the primary concern for HCNs. Home care nurses had great potential for motor vehicle accidents or death due to traffic congestion, weather conditions, mechanical failure, distance traveled, and time constraints. To compensate for travel and injury-related problems, HCNs suggested that agencies should provide them with company cars and regular maintenance. The agencies should also offer employer-paid long term disability coverage, life insurance, additional benefits to survivors, and provide car phones for emergencies or communication with team members. Also, HCNs had potential risk for being a victim of crime related to unsafe neighborhoods, family members, and firearms in the home. In addition, HCNs could be harmed by animals, such as dogs and flea bites, cat scratches, and environmental allergens. To solve the personal safety concerns in patients' homes, HCNs suggested the use of armed escorts in unsafe situations.

Massi-O'Malley (1993) confirmed additional work hazards which were unique to HCNs. For the fiscal year 1991-1992, a Florida home healthcare company with 600 employees in eight regional offices covering both urban and rural areas reported the following claims: motor vehicle accidents, 16 (2.6%); victims of crime in unsafe neighborhoods, 0 (0%); pet and flea bites, 5 (0.8%); exposure to communicable diseases, 2 (0.3%); slips and falls outside or within a patient's home, 15 (2.4%); back injuries related to patient care, 3 (0.5%).

Although LBIs were not addressed in Stephany (1993) and Massi-O'Malley (1993) research studies, attention should be paid to the unique health hazards for HCNs created by the uncertain external environment. According to Daft's (1992) organizational theory, an institutional setting such as a hospital is a mechanistic (stable), while a home care setting is an organic (unstable) working environment. Home care nurses encounter a large number of unexpected situations, and their work is not analyzable; hence, HCNs rely on their past experience, intuition, and judgement to solve problems. On the other hand, hospital-based nurses work in a formalized and standardized environment; their work problems can be solved by the use of standard procedures such as manuals or technical knowledge. As identified earlier, clients' conditions and behaviors were important contributing factors for LBIs among institutional nurses (Garg & Owen, 1992; Garg et al., 1991a, 1991b; Harvey & Lyons, 1993; Owen, 1987; Roth et al., 1993). Home care nurses not only face the same risk factors as hospital-based nurses, but they also encounter other potential risks related to factors such as weather, driving, animal, family members, and crime.

In summary, the only reliable source for identifying LBIs in Canada is from the administrative data on claims to the WCB. However, these injury data underestimate the actual number of LBIs because they ignore the near-accidents/close calls. Injured employees may choose not to report the injuries. Workers Compensation Board data cover only losses due to work related injury and WCB data cover only four fifths of the workforce. Although the incidence data for HCNs in Canada are not available, British and American studies illustrate that the incidence of LBIs among HCNs can be higher than their counterparts in hospitals because of their uncertain, unpredictable, and uncontrollable working environments.

Risk Factors/Behaviors of LBIs

Many occupational and non-occupational factors have been studied to determine their association with the incidence and prevalence of LBIs. Understanding the relationship between LBI workers and their job-related factors and the resulting risk of injury to the worker is a prerequisite to the development of schemes for safe workplace designs and placement of people in jobs that do not compromise their health and safety. LBIs can be triggered by direct trauma, a single exertion, or repetitive loading (Pope, Andersson, Frymoyer, & Chaffin, 1991). Jobs involving lifting, lowering, pushing, pulling, carrying, and holding; body movements such as frequent bending, twisting, and sudden movements; and working in bent-over postures appear to have a significant potential for producing LBIs. A combination of lifting, bending, and twisting appears to be most hazardous (Garg & Moore, 1992a, 1992b).

Non-occupational Factors

In addition to occupational factors, personal factors such as age, gender, years of employment, fatigue, and previous history of LBI(s) also contribute to LBIs. Several non-occupational risk factors/behaviors have been identified in the literature. LBIs occur most frequently in workers between 25 to 44 years of age (Erdil et al., 1994). In 1990, 62% of back injuries fell into this age group of people (Haggar-Guenette & Proulx, 1993). Besides age, gender (Alberta Labour, 1993; Erdil et al., 1994; Garg & Moore, 1992a; Haggar-Guenette & Proulx, 1992; Stubbs, 1991; Weeks, Levy, & Wagner, 1991) can also be a risk factor for LBIs. Far more men than women suffer work-related back injuries (121,000 compared with 42,000 in 1990) in Canada. However, women's share of back injury claims is increasing. By 1990, 26% of back-injury claims were made by women, as compared with just 18% in 1982 (Haggar-Guenette & Proulx, 1992).

Improving physical fitness is another factor which is widely believed to be associated with a reduction of back injuries and an increase in work capacity (Alberta Labour, 1993; Bigos et al., 1991; Erdil et al., 1994; Garg & Moore, 1992a; Stubbs, 1991; Tsai, Gilstrap, Cowles, Waddell, & Ross, 1992). As well, there is a general consensus that a previous history of back injury is one of the most reliable predictive factors for subsequent work-related back problems (Agnew, 1987; Alberta Labour, 1993; Erdil et al., 1994; Garg & Moore, 1992a; Stubbs, 1991; Troup, Foreman, Baxter, & Brown, 1987; Venning et al., 1987). Some also believe that a lack of work experience is associated with increased risk of LBIs (Garrett, et al., 1992; Greenwood, 1986; Jacknow, McCunney, &

Jofe, 1988). Other potential risk factors/behaviors for back injuries are fatigue (Kumar, 1990, 1994), obesity, and smoking (Alberta Labour, 1993; Stubbs, 1991; Tsai et al., 1992). It is possible that smoking impairs the nutrition of the intervertebral discs, thereby rendering smokers more vulnerable to injury (Tsai et al., 1992). However, occupational epidemiologic studies fail to show an association between these non-occupational factors and LBIs (Erdil et al., 1994; Prezant, Demers, & Strand, 1987; Skovron, Nordin, Sterling, & Mulvihill, 1987).

Occupational Factors

Findings from epidemiologic studies have indicated that LBIs may be caused, precipitated, or aggravated by occupationally-related tasks, such as forceful, repeated exertions, and lifting (Erdil et al., 1994; Venning et al., 1987). Occupational risk factors/behaviors for LBIs which have been identified are bending, lifting, repeated lifting, stretching, reaching, twisting, pushing, and pulling. Other job activities have been implicated as triggers for LBIs. These include prolonged sitting and standing, prolonged and repetitive occupational tasks, postural fatigue, and vibrations (Andersson et al., 1995; Erdil et al., 1994; Garg & Moore, 1992a). Besides task activities, characteristics of the object being handled can be risk factors. For example, objects may be too heavy, too wide, or too high to handle (Alberta Labour, 1993; Skarplik, 1988; Stubbs, 1991). Finally, psychological and psychosocial work factors such as stress (Bigos et al., 1991; Erdil et al., 1994; Frymoyer & Pope, 1987), monotony, and low job satisfaction (Andersson et al., 1995; Bigos et al., 1991; McAbee, 1988) have also been identified as risk factors for LBIs. Psychological fatigue could result from these job factors (Kumar, 1994). Lack of concentration might affect workers' alertness to changes in the environment.

In the nursing profession, lifting and transferring of clients are believed to be the most frequent precipitating factors of LBIs (Alberta Labour, 1993; Charney, Zimmerman, & Walara, 1993; Garg & Moore, 1992a; Garg & Owen, 1992; Garrett et al., 1992; Harvey & Lyons, 1993; Myers el al., 1993). For example, Owen and Garg (1989) found that 89% of the back-injury reports filed by hospital nursing personnel implicated a client-handling task as a precipitating factor. Harvey and Lyons (1993) found that back strains while handling clients were the major lost-time cases filed in Alberta WCB records.

Furthermore, prolonged and repetitive occupational tasks (Alberta Labour, 1993; Kumar, 1990a; 1989; 1994; Stubbs, 1991) are associated with occupational back problems. Client-handling tasks often requiring significant spinal loading had a high incidence of low-back problem (Kumar, 1990a; Stubbs, Buckle, Hudson, Rivers, & Worringham, 1983). Some client-handling tasks have been identified as risk factors for LBIs (Garg & Owen, 1992; Garg, Owen, & Carlson, 1992; Owen & Garg, 1991; Torma-Krajewski, 1987). Sixteen different patient-handling tasks have been ranked and rated for perceived physical stresses to the lower back. The top eight ranked tasks were those of transferring the client from one destination to another, such as from chair to toilet and vice versa. Weighing clients, lifting clients up in bed, repositioning clients in bed/chair, and making beds with/without clients were also identified as contributing factors for LBIs. Simply undressing clients, and feeding bed-ridden clients could produce physical stresses to the lower back (Garg et al., 1992; Owen & Garg, 1991). Similar results were found by Torma-Krajewski (1987). Moreover, Garg and Owen (1992) performed a biomechanical evaluation of the above client-handling tasks. They found that these tasks, mostly, have a mean compressive force on the lower back, especially on the fifth lumbar/first sacral disc. However, all these studies have investigated the risk factors for LBIs among NAs, not RNs. Home care nurses work alone in the client's home and do all the jobs which are usually done by the NAs in the institutional setting. Thus, HCNs might have the same ergonomic hazards as NAs.

Lifting alone is also a risk factor for LBIs among nursing personnel (Alberta Labour, 1993; Lagerlof & Broberg, 1989; Myer et al., 1993). Because of the unique situation nurses are in, nurses may make a judgment to do the lifting on their own rather than get help. It seems that nurses' commitment to client care is the major factor for lifting alone. Nurses frequently have to deal with unpredictable incidents, such as falls or slips. Nurses automatically respond by trying to prevent client injuries, and often injure themselves (Alberta Labour, 1993; Khalil et al., 1987; Lowenthal, 1994; Skarplik, 1988). Although in the health services, it is recommended that lifting unaided should be avoided (Lagerlof & Broberg, 1989), this rational and laudable ideal is not relevant to home care settings. Home care workers often have no choice but to lift the client alone (Myers et al., 1993; Skarplik, 1988) or to lift with the help of an under-trained or untrained family member, which has also been identified as a risk factor for back injuries (Charney et al., 1993).

Bent-over posture is another risk behavior for LBIs in nursing (Alberta Labour, 1993). Nurses were traditionally trained to lift with their backs and twist, and to bend over the client (Alberta Labour, 1993). The frequent use of bent-over posture would create a high level of postural stress. This could cause fatigue of back muscles due to the static nature of the work. Tasks often requiring bent-over posture are dressing changes, dressing clients, putting up and removing footrests and handrails, washing clients, lifting and transferring clients, and repositioning clients. Cramped conditions, space limitations (McAbee, 1988; Skarplik, 1988; Stubbs, 1991) and equipment design (differences between bed and chair heights and between wheelchair and toilet heights) further compound the problem (Garg et al., 1992). Khalil et al. (1987) and Pheasant (1987) agree that insufficient work heights such as beds, chairs, and toilet seats whose heights are difficult or impossible to adjust, lead to awkward body postures and asymmetric forces. These realities are the common settings in which home care workers work (Myers et al., 1993; Skarplik, 1988). Thus, HCNs may use bent-over posture often simply because clients' homes are designed and equipped without the benefit of ergonomics, such as low beds, double beds, small bathrooms, and cramped home environment (Hempel, 1993; Skarplik, 1988). These working environments may prevent HCNs from using the ideal body mechanics they have been taught and following precepts, such as, beds should be adjustable in height to the nurses' legs during handling clients (Lloyd, Tarling, Troup, & Wright, 1987).

Finally, LBIs can be caused by specific events, such as slipping, tripping, stumbling, catching the foot on something, having the surface collapse or tilt suddenly, a sudden unexpected load on the back, or blows to the back (Lagerlof & Broberg, 1989; Garg & Moore, 1992a). Moreover, additional unique risk factors for LBIs among HCNs may include motor accidents and animal bites. Home care nurses provide nursing care primarily to homebound clients. Usually they have to visit at least five clients per day. Unlike hospital-based nurses, HCNs are required to travel (Marvan-Hyam, 1986; Myers et al., 1993; Skarplik, 1988), and thus they are prone to motor-vehicle related injuries

(Morgan, 1991). As a matter of fact, vehicle drivers have been identified as a high risk group for LBIs (Andersson et al., 1995). One research study found that driving a car more than four hours a day was associated with back problems (Walsh et al., 1989). Another risk factor, guard dogs biting at ankles could contribute to LBIs, too. Thus, road, weather, and neighborhood conditions could be unique risk factors for LBIs among HCNs.

In summary, risk factor/behaviors of LBIs identified are lifting, bending, stretching, reaching, twisting, pushing and pulling, prolonged sitting and standing, postural fatigue and vibrations. Direct trauma, such as accidents, is another contributing factor. For nursing personnel, lifting and transferring clients from one place to another is the primary risk factor for LBIs. There is a scarcity of literature on the unique work hazards of LBIs on HCNs. However, a careful review of the literature suggested that HCNs not only face the same risks factors as hospital-based nurses, but also may be prone to have more LBIs because of unstable working environments.

LBI Prevention Strategies

Three strategies for controlling LBIs have been recommended in industry: employment pre-selection, education and training, and ergonomic job design (Alberta Labour, 1993; Andersson et al., 1995; Weeks et al., 1991). However, the scientific literature indicates that job-specific strength testing and ergonomic job design are only partially effective in preventing LBIs (Garg & Moore, 1992b). Moreover, education alone is not effective (Alberta Labour, 1993; Triolo, 1989b; Troup, 1989; Venning, 1988). Since an exclusive preventive strategy has not been established, Kumar (1990b) proposes that the combination of these three strategies incorporated into a management program would provide holistic control of the LBI problem.

In nursing practice, the dominant programs for back injury prevention are education and training in proper lifting techniques, body mechanics, and back care (Feldstein, Valanis, Vollmer, Stevens, & Overton, 1993; Greenwood, 1986; Jensen, 1990; Karas & Conrad, 1996; Lammon, Foote, Leli, Ingle, & Adams, 1995; Lowenthal, 1994; Roth et al., 1993). Generally, nurses believe that the primary way to avoid back injuries from client-handling activities is to always apply proper body mechanics and follow lifting guidelines (Harber et al., 1988; Lammon et al., 1995). The facts are that some client-handling tasks are so stressful that back injuries result even when all the proper techniques are used. For instance, the client is just too heavy to handle (Kahlil et al., 1987; Lowenthal, 1994). The Workplace Practices Guide for Manual Lifting ("U.S. Department," 1981) is widely used in different work settings including health care. Alberta Labour criticizes this guide as an unrealistic tool because "it was based on a number of assumptions (i.e. the task involves: no twisting, two-handed lifts, good hand-holds, balanced load, unrestricted posture, one lift every five minutes, good footing, good environment). In practical terms, manual-handling tasks often involve more than just lifting and lowering. This calculation does not take into account the effects from vibration, sudden movements, carrying, or pushing and pulling loads. In other words, it can be usefully applied to some, but not all, situations" (Alberta Labour, 1993, p. 13). In addition, some client-handling tasks are not amenable to the use of proper body mechanics (Garg et al., 1991a, 1991b; Garg et al., 1992; Gagnon et al., 1986; Owen, 1987). Owen (1987) illustrated some examples. The human load cannot be handled close to the body due to the width of the bed; the knees cannot be flexed due to the position of the side rail;

and the feet cannot be placed a shoulder length apart simply because of the confined work place. Furthermore, even with the proper lifting/transferring techniques, there is always a mismatch, such as between the size of the client and the length of the nurse's arm (Troup, 1989), and between the size of the client (too large) and the nurse (too small) (Lowenthal, 1994). Finally, Venning (1988) argues that there is a lack of consensus on proper lifting techniques in patient transfer.

However, for HCNs, the availability of back injury prevention education and training program is the fundamental problem. Educating and training workers are the oldest and most commonly used approaches to preventing LBI problems. A variety of back schools have been used as coordinated ways of training workers either before or after an injury. The results look promising (Weeks, Levy, & Wagner, 1991). Massi-O'Malley (1993) indicated that programs/services provided to prevent occupational injuries within one Florida home healthcare company were: a wellness program which promotes physical fitness and body mechanics; driving safety classes; infection control programs; information to deal with pets; security services; and portable phones. Related benefits provided for nurses include medical, disability, and life insurance; double life insurance to beneficiaries; and reimbursement for mileage. Generalizability of this study is questionable because it was done in only one particular company. Also, the contents of the programs were not discussed in the article.

Another study done by Smith and White (1993) provided a much clearer education program in the home care agencies. This survey study involved 198 directors of home health care agencies in counties of Northern California, from the northern state border to counties south of the greater San Francisco Bay area. Participants were asked questions related to the nature of occupational health programs. Occupational health programs were described in terms of their locus of administration and management. Of 58 home care agencies in Northern California, 31 (53.4%) of the occupational health programs were in-house; 17 (29.3%) were hospital affiliated; 5 (8.6%) were contracted; and 5 (8.6%) were employees' own physicians. These results showed that about half of the occupational programs were not in-house. That means home care employees could not get the services they wanted in-site. They had to make appointments and traveled certain miles to get the services. It was inconvenience which could be the barrier for the employee to seek occupational health expertise.

In the Smith and White (1993) study, participants were also asked questions related to policies and educational programs in a number of quality assurance areas. Components of occupational health programs were presented in terms of the presence of formal written policies and education for specific areas. Although all agencies responding to the questionnaires had a formal written policy on universal precautions, only 89.5% provided education on the subject. For the reporting and follow up for occupational injury/illness, 98.2% had written policy, but only 91.2% provided education. Ninety seven percent of agencies had policy for pre-placement health assessment, but only 91.2% provided education on the subject. LBIs were identified as the most common occupational injury in this study. However, only 82.5% of agencies had formal written policy on back care protection and lifting, and 86% provided education/training on the subject. This shows that back care protection and lifting techniques require more attention.

Although instruction on lifting techniques on client transfer is widely accepted because of its believed prophylactic value, there is no scientific evidence that it alone is effective in reducing LBIs, especially in nursing practice (Triolo, 1989b; Troup, 1989; Venning, 1988; Wood, 1987). One reason education fails to have a significant impact on back problems is that even the smallest adult client can exert an unsafe load on the lower back (Khalil et al., 1987; Owen & Garg, 1991). Another reason would be the compliance of nursing personnel with proper lifting technique. Although mechanical lift devices are often available in hospitals and nursing homes, some barriers to using these devices have been identified (Garg et al., 1992; Owen & Garg, 1991; Roth et al., 1993). Some of the reasons for not using the devices are: time required, lack of staff, and limited space (Bell, 1987). Also, some devices are not suitable in certain situations. For example, many lift devices have seat slings that complicate toileting and the changing of adult incontinent briefs (Roth et al., 1993). Moreover, most of the time, after transferring a client by using the device, the client still needs to be manually lifted again to be repositioned (Garg et al., 1992). For HCNs, availability of the mechanical lift device may be the fundamental problem.

Other components such as ergonomic factors could be included in a comprehensive back injury prevention program (Alberta Labour, 1993; Garg & Owen, 1992; Myers et al., 1993; Owen, 1987; Troup, 1989; Troup & Rauhala, 1987). Ergonomics applied to hospital or community health services is "the study of the relationships between the health professionals and their working capacity, the physical and mental nature of their work, the patients in hospitals and in the community at whom it is directed and the environment in which the work is done" (Troup, 1989, p. 252). The application of an ergonomic approach to clients may lead to safer and more efficient methods of handling clients, which may reduce the present level of low-back stress for nursing personnel (Garg et al., 1992; Garg et al., 1991a, 1991b; Harber, Bellet, Gutowski, Soohoo, Lew, & Roman, 1985; Jensen, 1990; Lloyd et al., 1987; Owen, 1987; Stubbs, 1987).

Ergonomic job design is an organizational factor for controlling LBIs. One study showed that a back program itself did not reduce back injuries (Wood, 1987). Only when organizational factors such as increasing the communication between the claimant, the doctor, the WCB, and the hospital are added, does a back program have a strong inhibiting effect on the frequency of back injuries (Wood, 1987). Further, Garrett et al. (1992) stated that training/orientation should require evaluation of ability and techniques in lifting. Also, training and evaluation should be repeated whenever assignments are changed. These organizational solutions for LBIs need top management support. However, Emmett and Baetz (1987) stated that health care workers outside hospitals have less access to adequate employee health services. So, not surprisingly, in a nursing worklife study (Alberta Health, 1991), most Alberta HCNs were somewhat dissatisfied with their employer's efforts to provide access to programs to help them deal with work-related problems, and their employer's commitment to promoting employee well-being. Jensen (1990) argued that "without a strong commitment to employee safety by the top management, even great program ideas will never come to fruition" (p. 254).

CHAPTER THREE

Method

A descriptive survey was used to explore low-back injuries (LBIs) in Alberta home care nurses (HCNs) in 1996. A review of the literature shows that there is little prior knowledge of LBIs in the population of HCNs. The purpose of a descriptive study is to examine one or more aspects of the problem in a specific population when the literature review fails to reveal any significant research in the area (Brink & Wood, 1994). The data collected "may lead to suggestions of hypotheses for further study or to an idea for a conceptual framework to explain the action of the variables" (Brink & Wood, 1994, p. 107).

Population

The target population for this study was all Alberta HCNs. That is, all 1114 Registered Nurses (RNs) who reported Home Care as their category of employment when renewing registration for 1996 were surveyed via the Alberta Association of Registered Nurses (AARN). Replacement of RNs by less skillful health care workers is one of the strategies to save a few health care dollars. This trend creates high unemployment among RNs. These unemployed RNs may work as licenced practical nurses (LPNs), nursing attendants (NAs), or even personal care attendants in the home care setting to maintain their financial security. Thus, although some RNs register themselves as HCNs with the AARN, actually they work as LPNs, NAs, or personal care attendants (PCAs).

Data Collection Procedure

The population was accessed through the AARN registrar's office from a computerized mailing list of HCNs practicing in Alberta. Permission to access HCNs was obtained from the Executive Director of the AARN (Appendix D). The RN Mailing Services mailed out the introductory letter (Appendix E) explaining the purpose of the study and the Home Care Nurses' Low Back Injury Questionnaire(HCNLBIQ) (Appendix F) to all HCNs. It was explained that participation was voluntary and responses were anonymous. It was also stated that the AARN was distributing the questionnaire, but did not endorse the study. Respondents were asked to return the completed questionnaire in a postage-paid self-addressed coded return envelope to the investigator. The RN Mailing Services also mailed out reminder post-cards (Appendix G) three weeks after the original mailing of the questionnaire to all non-respondents as determined by the coded envelopes returned.

Survey Instrument

The questionnaire was developed by the investigator from the literature review and a modification of a back injury audit provided by Bernadette Bolcic (Appendix H), a physiotherapist at the University of Alberta Hospitals (1995). This audit was developed by a subcommittee of the Back Injury Task Force Advisory Committee, University of Alberta Hospital. Forty-two items consisting of both open-ended and fixed-format questions elicit demographic data and data pertaining to LBIs. There are five sections in the questionnaire. Section I has 3 risk-factor/behavior items. Home care nurses were asked to identify the perceived risk factors/behaviors for LBIs. Section II contains 11 items related to incidence, reporting practices, and risk factors/behaviors for LBIs. Only those HCNs who had had LBIs were required to answer this section. Section III has 4 near-accident/close call items. Two open-ended questions were used to capture information related to this variable. Section IV involves 4 resource items. The intent of this section was to investigate organizational factors related to back injury prevention. Finally, section V has 20 demographic items.

The HCNLBIQ was reviewed by two experts in the home care field, two in the occupational health and safety field, two ergonomists, and two experts in questionnaire design to ensure face and content validity. Each expert was asked to use a 4-point rating scale (1 = not relevant; 2 = unable to assess relevance without item revision or item is in need of such revision that it would no longer be relevant; 3 = relevant but needs minor alteration; and 4 = very relevant and succinct) to assess each item (Lynn, 1986). Eighty-eight percent, that is seven out of eight agreement among experts was considered acceptable for this study (Lynn, 1986). In addition, the experts were asked to identify any area(s) that had been omitted from the questionnaire. Minor modifications of the questionnaire were done after review by the experts.

Finally, the HCNLBIQ was pilot tested on ten Alberta HCNs. Jean Kipp, Director of Community Care, Capital Health Authority (Appendix I), and the Edmonton Medical Registry (Appendix J) were contacted to obtain permission to access ten Edmonton HCNs for the pilot study. Participation in the pilot study was voluntary. The questionnaire was distributed to the ten HCNs in person and they were given one week to complete the questionnaire before returning the questionnaire directly to the investigator. Minor editorial changes of the questionnaire were made based on the results of the pilot study.

Data Analysis

The data analysis was conducted using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics such as frequencies, means, standard deviations, and percentages were used to describe the occurrence of LBIs, the reporting practices of HCNs experiencing LBIs, risk factors/behaviors for LBIs, and the nature of near-accidents/close calls. Data were also analyzed according to the demographic variables. Pearson r was used to determine the correlation coefficient among the variables, and chi-square test to determine associations among LBIs, risk factors/behaviors, and demographic factors (McClave & Dietrich II, 1989). Content analysis, "the process of structuring unstructured data" (Brink & Wood, 1994, p. 215), was undertaken for open-ended questions of the HCNLBIQ. Sorting variables is a coding strategy in content analysis (Krahn, 1990). Responses containing textual material relevant to a particular theme or research question were identified and then grouped together under one variable. For example, such variables could "label" responses containing risk factors for LBIs from working heights, bed width, working space, HCNs' physical status, and clients' cooperation.

Ethical Considerations

Ethical clearance was obtained from the Joint Ethics Review Committee, Faculty of Nursing, University of Alberta and the University of Alberta Hospitals (Appendix K). A covering letter and the questionnaire were distributed to all Alberta HCNs via the AARN. Participation in this study was voluntary and without financial remuneration. No identification of the individual or health care agency was recorded on the questionnaire. Only a code number was placed on the return envelope so that reminder postcards could be sent to nonrespondents. No written consent form was required in this study, as completing and returning the questionnaire served as the consent to participate. The data will be stored in a locked file cabinet for at least seven years. Only the investigator and members of her supervisory committee have access to the completed questionnaires. Hence, anonymity and confidentiality will be maintained. Since the questionnaire was the only method of data collection, no physical or psychological risks were perceived as inherent to the study. Each HCN had the freedom to determine whether or not he/she would participate in the study. Home Care Nurses were welcome to discuss questions and concerns at any time by contacting the investigator or the co-supervisors.

CHAPTER FOUR

Findings

A descriptive survey was conducted to describe low-back injuries (LBIs) in Alberta home care nurses (HCNs). Five variables were examined: the incidence, risk factors/behaviours, organizational resources, reporting practices, and nature of near-accidents/close calls related to LBIs. Furthermore, the relationships among risk factors/behaviours, organizational resources, and reporting practices for LBIs among Alberta HCNs were investigated. Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS) Version 7.0 for Windows (1995). Descriptive statistics such as frequencies of responses (means, medians, modes, percentages), ranges, and standard deviations were calculated for each item of the Home Care Nurses' Low-Back Injury Questionnaire (HCNLBIQ). Pearson r was used to determine the correlation coefficient among the variables, and chi-square analysis to determine associations among risk factors/behaviors, organizational resources, and reporting practices.

Characteristics of the Sample

The population of 1114 Registered Nurses (RNs) employed in Home Care in Alberta were surveyed through the Alberta Association of Registered Nurses (AARN). A total of 409 home care RNs returned their questionnaire. Nine respondents returned the questionnaire unanswered for various reasons, such as no longer employed in home care and not providing direct client care. These 400 respondents provided a survey response rate of 35.9 percent. The majority of the respondents were female (99.5%); only 2 males responded. Thirty-five percent of the respondents were aged 35 - 44 years, 32.6% were aged 45 - 54 years, and 21.3% were aged 25 - 34 years (Table 1).

Table 1

Distribution of Respondents' Age and Gender

Characteristics	n	Percent (%)
Age	N=399	
18-24 years	12	3
25-34 years	85	21.3
35-44 years	141	35.3
45-54 years	130	32.6
55-64 years	30	7.5
65 and over	1	0.3
Gender	N=399	
Male	2	0.5
Female	397	99.5

Table 2 presents the results for place of employment. The majority of the respondents worked in Government home care agencies (82.6%). Only 14.4% (n=57) of respondents reported that they worked in private home care agencies. Most nurses (54.4%) worked in urban settings, 103 (25.9%) nurses worked in urban-rural, and 19.7% (n=78) worked in rural home care settings. Returned questionnaires covered all Alberta Regional Health Authorities (ARHAs), but with differing response rates: 5 ARHAs had less than 10 responses, but 10 ARHAs had 10 - 30 responses, and 2 ARHAs had 95 - 97 responses. The last 2 major responses were from the Calgary Regional Health Authority (24.5%) and the Capital Health Authority (24%).

Table 2

Respondents' Place of Employment

Characteristics	n	Percent (%)
Working Place	N=397	
Private home care agency	57	14.4
Government home care agency	328	82.6
Work Settings	N=397	
Rural	78	19.7
Urban	216	54.4
Urban-rural mix	103	25.9
Alberta Health Care Regions	N=396	
Chinook	21	5.3
Pallister	14	3.5
Headwater	8	2
Calgary	97	24.5
Regional health authority #5	10	2.5
David Thompson	30	7.6
East Central	26	6.6
WestView	12	3
Crossroads	13	3.3
Capital	95	24
Aspen	16	4
Lakeland	26	6.6
Mistahia	14	3.5
Peace	5	1.3
Keewestinok Lakes	4	1
Northern Lights	3	0.8
Northwestern	2	0.5

Table 3 illustrates the respondents' current positions, education level, and nursing experiences. Most HCNs, 49.87% (n=198), worked as a Case Coordinator/Manager, and 9.32% (n=37) HCNs as a supervisor. However, 10 RNs worked as Licenced Practical Nurses (LPNs)/Nursing Attendants (NAs)/Personal Care Attendants (PCAs) (2.52%). Diploma-prepared nurses represented the majority of the respondents (57.43%), with

39.04% (n=155) nurses having completed a baccalaureate degree in nursing. Approximately 30% (n=122) of the respondents had 22 years or more nursing experience; however, only 3 respondents had worked in home care for 22 years or more. The largest subset of the respondents had worked in home care for 2 - 5 years (34.92%).

Table 3

Distribution of Respondents' Demographic Characteristics

Characteristics	n	Percent (%)
Current Nursing Positions	N=397	
Supervisor	37	9.32
Case coordinator/Case manager	198	49.87
Clinical specialist	2	0.50
Staff nurse	161	40.55
Licensed practical nurse/Nursing aide/Personal care attendant	10	2.52
Level of Nursing Education	N=397	
Diploma	228	57.43
Bachelor of science in nursing (basic)	73	18.39
Bachelor of science in nursing (post-RN)	82	20.65
Masters in nursing	6	1.51
Doctorate in nursing	0	
Years of Nursing Experience	N=397	
1 year or less	15	3.78
2-5 years	32	8.06
6-9 years	44	11.08
10-13 years	54	13.60
14-17 years	62	15.62
18-21 years	68	17.13
22 years or more	122	30.73
Years of Home Care Experience	N=398	
1 year or less	55	13.82
2-5 years	139	34.92
6-9 years	92	23.12
10-13 years	54	13.57
14-17 years	42	10.55
18-21 years	13	3.27
22 years or more	3	0.75

On average, HCNs worked 21 - 30 hours in a week (M = 21-30 hours; Mdn = 26-30 hours; mode = 36-40 hours) (Table 4). Of the 391 responses, 65.22% of the nurses stated that they worked overtime. The number of overtime hours per week ranged from 0.04 hours - 60 hours (M = 3.95 hours, SD = 6.47 hours).

Table 4

Distribution of Respondents' Hours of Work

Characteristics	n	Percent (%)
Average of Hours of Work per Week	N=396	
1-5 hours	15	3.7
6-10 hours	24	6.1
11-15 hours	31	7.8
16-20 hours	63	16
21-25 hours	59	14.9
26-30 hours	32	8.1
31-35 hours	73	18.4
36-40 hours	77	19.4
Over 40 hours	22	5.6

Table 5 identifies the main nursing activities in home care and activities outside work. Respondents were asked to rank in order, the 5 most frequent weekly activities in Home Care by assigning 1 as most frequent to 5 least frequent. Five major activities were identified: driving ranked first (n=120); teaching clients ranked second (n=73); charting in office/clients' homes, and medication monitoring both ranked third (n=61); medication monitoring ranked fourth (n=62); and charting in office/clients' home ranked fifth (n=56). Whether most frequent or least frequent, driving and charting figured predominately. Both activities involve sitting positions.

Table 5

Nursing Activities in Home Care

Rank	1	2	3	4	5	n
Lifting Clients	15	9	11	11	21	67
Transferring Clients	20	10	7	19	18	74
Repositioning Clients	7	10	17	11	24	6
Weighing Clients	2	3	7	8	18	38
Dressing Changes	60	57	46	55	49	213
Footcare	16	19	23	12	44	114
Teaching Clients	96	73	53	52	34	308
Charting in Car	5	7	14	9	32	67
Charting in Office/Clients'Home	73	66	61	58	56	314
Driving	120	55	60	52	39	326
Intravenous Transfusion	7	9	11	14	25	66
Medication Monitoring	43	55	61	62	55	276

The three most frequent weekly activities outside nursing work were also identified in Table 6. First was housework/laundry (n=225), second was housework/laundry (n=111), and third was shopping (n=100). By rank, the HCNs predominately occupied their off duty hours in activities related to household responsibilities.

Table 6

Activities Outside Work

Rank	1	2	3	n
Housework/Laundry	225	111	34	370
Shopping	16	91	100	207
Yardwork/Gardening	10	40	43	93
Care of Dependent Family Members	76	34	24	134
Watching T.V.	15	23	55	93
Physical Exercise	24	33	50	107
Computer Entertainment	4	4	17	25
Walking	35	51	57	143
Sitting	27	32	36	95

Incidence of LBIs

The incidence of LBIs in Alberta HCNs was obtained in response to questions asking HCNs whether or not they: (1) considered the risk of LBI as a problem in home care, (2) had a work-related LBI prior to the last 12 months, (3) had a work-related LBI within the last 12 months, and what number of LBIs they reported if they had had a LBI (Table 7).

Three hundred and forty nine of 386 respondents (90.41%) reported that they considered the risk of LBI to be a problem in home care. Among all 400 respondents, 25.8% (n=103) stated that they had a work-related LBI prior to the preceding 12 months and 13.5% (n=54) indicated that they had a work-related LBI within the previous 12 months. Of these 54 respondents, 84.62% (n=44) reported that they had a combined total of 69 LBIs. The number of LBIs occurring to any one nurse ranged from 1 to 5. Ten HCNs, who had LBIs within the previous 12 months, did not indicate how many LBIs they experienced during this one year period. Thus, the possible total number of LBIs in the previous 12 months would be a minimum of 79.

Table 7

Incidence of Low-Back Injuries in Home Care

Components	Yes	No	n	Frequency (y)	(x)(y)
Risk of LBIs	349	37	386		
LBIs within last 12 months	54	346	400		
LBIs reported	25	29	54		
Number of LBIs (x)					
1				30	30
2				5	10
2.5 (2-3)				2	5
3				5	15
4				1	4
4.5 (4-5)				1	4.5
98* (at least one)				10	10
Total				54	78.5
Number of LBIs reported (x)					
1				16	16
2				1	2
3				1	3
Total				18	21
Number of Near-accidents/Close calls for LBIs					
1				59	59
1.5 (1-2)				8	12
2				60	120
2.5 (2-3)				5	12.5
3				21	63
3.5 (3-4)				6	21
4				9	36
5				8	40
5.5 (5-6)				2	11
6				8	48
7				1	7
7.5 (7-8)				1	7.5
8				1	8
10				4	40
11				1	11
12				1	12
25				1	25
48				1	48
99* (at least one)				21	21
Total				218	602

Risk Factors/Behaviors for LBIs

Home Care Nurses' perceptions of risk factors/behaviors for LBIs were obtained in response to Likert-type scale questions (1 = no risk; 2 = low risk; 3 = medium risk; and 4 = high risk) asking nurses to indicate the relative seriousness of the factors specifically in the home care setting. These factors/behaviors included three areas: environment, nurse, and client. In addition, risk behaviors for LBIs were captured in the question asking whether or not the respondents were using any lift/transfer devices to assist them when they had a work-related LBI. Furthermore, respondents were asked to indicate the reason for not using a lift/transfer device. Frequency of HCNs' use of biomechanical techniques for preventing LBIs was also examined with a Likert-type scale (1 = always; 2 = often; 3 = sometimes; 4 = never).

Environmental Factors for LBIs

Thirteen items were reviewed under environmental factors for LBIs (Table 8). One open-ended question was included to identify more work-related risk factors/behaviors for LBIs. Working height was considered as the highest environmental risk factor for LBIs. More than 50% (n=214) of respondents indicated this factor contributed to high risk for LBIs. Three hundred and sixty-eight of 400 respondents (92%) reported that working height had medium to high risk (M = 3.45; Mdn = 4; mode = 4; SD = .67). The second highest risk factor in this category was bed width. Three hundred and twenty of 399 respondents (80.2%) stated that bed width contributed to a medium to high risk (M = 3.11; Mdn = 3; mode = 3; SD = .75). The third highest risk factor identified was working space. Two hundred and eighty of 398 HCNs (70.35%) indicated that working space contributed to a medium to high risk for LBIs (M = 2.91;

Mdn = 3; mode = 3). The fourth highest risk factor was equipment hard to move through cramped spaces. Two hundred and seventy-one of 398 respondents (68.1%) stated that this factor contributed to a medium to high risk (M = 2.9; Mdn = 3; mode = 3). Other factors considered risky were equipment not available (63.8%), obstacles (55.5%), storage arrangement (53.3%), and lighting (50.4%).

Some environmental risk items were identified as low risk. The least risk was related to the work station in the office. One hundred and seventeen HCNs (29.5%) reported this factor to be no risk, and 190 HCNs (77.5%) identified that it contributed to a low to no risk for LBIs. The second lowest risk factor was equipment that was not maintained. More than 50% (n=221) reported that it contributed to low risk for LBIs. Two hundred and sixty-two of 399 respondents (65.7%) stated that it contributed to a low to no risk. Other factors considered not risky were: equipment wrong size (57.4%), floor surface (56.3%), and unsuitable equipment (54.1%).

Table 8

Environmental Risk Factors for Low-Back Injuries

Statement	**No Risk (1)**	**Low Risk (2)**	**Medium Risk (3)**	**High Risk (4)**	**n**	**Measures of Central Tendency**			
						M	Mdn	Mode	SD
Working Heights	4	28	154	214	400	3.44	4	4	0.67
Bed Width	6	73	190	130	399	3.11	3	3	0.75
Storage Arrangement	20	167	171	42	400	2.59	3	3	0.74
Working Space	13	105	183	97	398	2.91	3	3	0.80
Floor Surfaces	27	198	141	34	400	2.46	2	2	0.74
Work Station in Office	117	190	64	25	396	1.99	2	2	0.84
Obstacles	14	164	180	42	400	2.63	3	3	0.72
Equipment wrong size and/or awkward to operate	28	201	120	50	399	2.48	2	2	0.80
Equipment hard to move through cramped spaces	14	113	169	102	398	2.90	3	3	0.82
Equipment not available when needed	21	124	147	108	400	2.86	3	3	0.88
Equipment not maintained and/or not in working condition	41	221	91	46	399	2.36	2	2	0.82
Equipment not suitable for the situation	22	193	136	46	397	2.52	2	2	0.77
Lighting	29	168	147	53	397	2.56	3	2	0.81

Nurse Factors for LBIs

Eleven items were identified as nurse factors for LBIs (Table 9). One open-ended question was included to identify more work-related risk factors/behaviors for LBIs. Two hundred and sixty-one of 397 respondents (65.8%) reported that fatigue level contributed to a medium to high risk for LBIs (M = 2.83; Mdn = 3; mode = 3). The second highest risk factor identified in this category was fitness level. Two hundred and fifty-two of 399 HCNs (63.1%) stated that it contributed to a medium to high risk. The third factor was staff-patient ratio. Two hundred and twenty-nine of 396 respondents (57.8%) perceived that it contributed to a medium to high risk (M = 2.74; Mdn = 3; mode = 2). The physical status of HCNs (56.2%) was also identified as a high risk factor with a mode of 3.

More than 50% of respondents identified work clothing (n=224) and age (n=203) to be low risk factors for LBIs. Work clothing was reported as the least risky factor for LBIs. Three hundred and ten of 399 HCNs (77.7%) indicated that it contributed to a low to no risk. The second least risky factor was drug/alcohol use. Two hundred and seventy-six of 393 respondents (70.3%) perceived that it contributed to a low to no risk. The third was age. Two hundred and forty-seven of 394 respondents (62.7%) indicated that it contributed to a low to no risk for LBIs. Other low risk factors identified were work footwear (60.5%), use of equipment (58.5%), assessment prior to task (57.7%), and knowledge of lifting (53.3%).

Table 9

Nurse Risk Factors for Low-Back Injuries

Statement	**No Risk (1)**	**Low Risk (2)**	**Medium Risk (3)**	**High Risk (4)**	**N**	**Measures of Central Tendency**			
						M	Mdn	Mode	SD
Age	44	203	129	18	394	2.30	2	2	0.73
Physical Status	25	149	170	53	397	2.63	3	3	0.79
Fitness Level	21	126	194	58	399	2.72	3	3	0.77
Fatigue Level	19	117	175	86	397	2.83	3	3	0.82
Drug/Alcohol Use	183	93	42	75	393	2.02	2	1	1.16
Knowledge of how to use equipment	46	186	93	72	397	2.48	2	2	0.92
Knowledge of Lifting/Transferring Techniques	44	167	77	108	396	2.63	2	2	1.00
Assessment prior to task	40	187	104	63	394	2.48	2	2	0.88
Staff-patient ratio	35	132	130	99	396	2.74	3	2	0.94
Work Footwear	55	185	113	44	397	2.37	2	2	0.86
Work Clothing	86	224	70	19	399	2.01	2	2	0.76

Client Factors for LBIs

Twelve items were reviewed under the client factors for LBIs (Table 10). One open-ended question was included to identify more work-related risk factors/behaviors for LBIs. All client factors were considered as medium or high risk factors for LBIs except clients' clothing. More than 50% of the respondents (n=221) indicated that clothing created low risk. Two hundred and forty-six of 397 HCNs (62%) indicated that it contributed to a low to no risk for LBIs.

More than 50% of the respondents indicated that weight (n=211) and muscular dysfunction (n=200) contributed to high risk for LBIs. Also, more than 50% of HCNs reported that coordination (n=214), fatigue level (n=211), and body awareness (n=207) contributed to medium risk for LBIs. The top three risk factors for LBIs in this category were: clients' weight (96%), clients' mobility and flexibility (93.2%), and clients' muscular dysfunction (92.7%).

Table 10

Client Risk Factors for Low-Back Injuries

Statement	**No Risk (1)**	**Low Risk (2)**	**Medium Risk (3)**	**High Risk (4)**	**N**	**Measures of Central Tendency**			
						M	Mdn	Mode	SD
Client Weight	2	18	167	211	398	3.47	4	4	0.61
Client Height	6	72	190	130	398	3.12	3	3	0.75
Client Clothing	25	221	122	29	397	2.39	2	2	0.72
Client Fatigue Level	9	85	211	93	398	2.97	3	3	0.73
Client Mobility and Flexibility	2	25	174	197	398	3.42	3	4	0.63
Client Muscular dysfunctions	4	25	168	200	397	3.42	4	4	0.66
Client Mental Awareness	5	71	197	125	398	3.11	3	3	0.73
Client Body Awareness	6	88	207	97	398	2.99	3	3	0.73
Client Coordination	4	54	214	126	399	3.16	3	3	0.68
Client Cooperation	7	86	157	147	397	3.12	3	3	0.80
Emotional Status	10	142	181	65	398	2.76	3	3	0.75
Communication Problems	10	140	171	73	394	2.78	3	3	0.77

Use of Lift/Transfer Devices

In order to find out whether use of lift/transfer devices could be a risk factor/behaviour, respondents were asked if they used any lift/transfer devices when they had a work-related LBI (Table 11a). Only ninety HCNs provided an answer to this question. Among them, eighty-two (91.1%) reported that they did not use lift/transfer devices. Reasons for not using these devices were: devices unavailable (68.29%), limited space (23.17%), client refusal to use the device (18.29%), manual lifting afterward, anyway (17.07%), too time consuming (14.63%), lack of skill or experience (0.06%), client safety (0.05%), and physical effort required (0.05%) (Table 11b).

Among these ninety HCNs, eight (8.9%)HCNs stated they used lift/transfer devices when LBIs occurred (Table 11a). Reasons for having LBIs even when lift/transfer devices were used were: limited space (100%), injury occurrence in spite of proper use of a functioning lift/transfer device (75%), wrong lift/transfer device for the purpose (50%), misuse (37.5%), poor maintenance of device/not working properly (25%), and failure of device (25%) (Table 11c).

Table 11a

Use of Lift/Transfer Device When LBIs Sustained

	Yes	No
Using Lift/Transfer Device	8	82

Table 11b

Reason for Not Using a Lift/Transfer Device When LBIs Sustained

Reasons	n	Percent (%)
	N= 82	
Not available	56	68.29
Too time consuming	12	14.63
Physical effort required	4	4.87
Limited space	19	23.17
Manual lifting needed afterward, anyway	14	17.07
Client refusal to use the device	15	18.29
Client safety	4	4.87
Lack of skill or experience	5	6.10

Table 11c

Reasons for a LBI While Using a Lift/Transfer Device

Reasons	n	Percent (%)
	N=8	
Wrong lift/transfer device for the purpose	4	50
Lift/transfer device poorly maintained/not working properly	2	25
Lift/transfer device failed	2	25
Injury occurred in spite of proper use of a functioning of the lift/transfer device	6	75
Misuse of the lift/transfer device	3	37.5
Limited space	8	100

Frequency of Using Biomechanical Techniques

Respondents were asked how often they would use biomechanical techniques, such as bending knees and keeping back straight while lifting, for preventing LBIs (Table 12). Three hundred and ninety HCNs provided an answer. Over 50% (n=226) reported that they often used the techniques. Only one hundred and thirty-seven of 390 respondents

(35.1%) stated they always used the technique. Twenty-six stated they used biomechanical techniques sometimes, and one HCN indicated that she/he never used the techniques.

Table 12

Frequency of Using Biomechanical Techniques

Responses	n	Percent (%)
	N=390	
Always	137	35.1
Often	226	57.9
Sometimes	26	6.7
Never	1	0.3

(M=1.7205; Mdn=2; Mode=2; SD=0.5924)

Knowledge of Prevention of LBIs

Respondents were assessed on their knowledge of how to prevent LBIs (Table 13). Eleven related questions were asked. Ninety-nine percent (n=394) agreed that bending knees, keeping back straight, and lifting with the leg muscles prevent LBIs. Ninety-five percent (n=378) respondents believed that lift/transfer devices reduced LBIs. Three hundred and sixty-eight (93%) HCNs considered themselves to be informed about how to prevent LBIs. Ninety-three percent (n=370) HCNs believed that ongoing education and training reduced LBIs. Three hundred and sixty-one (93%) respondents agreed that fatigue was a risk factor for LBIs. About 80% of HCNs agreed on the rest of statements except on the pre-employment health assessment. Thirty-nine percent (n=152) of respondents were not sure whether pre-employment health assessment could reduce LBIs, 28% agreed with the statement, and 25% disagreed with the statement.

Table 13
Respondents' Knowledge of How to Prevent LBIs

Statement	Strongly Disagree (1)	Disagree (2)	Unsure (3)	Agree (4)	Strongly Agree (5)	N	**Measures of Central Tendency**			
							M	Mdn	Mode	SD
I am informed about how to prevent LBIs	1	13	16	249	119	398	4.19	4	4	0.68
LBIs are related to handling Clients	4	62	30	255	46	397	3.70	4	4	0.90
Lift/transfer devices reduce LBIs	1	5	15	242	136	399	4.27	4	4	0.62
Ongoing education and training reduce LBIs	0	9	19	212	158	398	4.30	4	4	0.67
Pre-employment health assessment reduces LBIs	10	98	152	111	27	398	3.12	3	3	0.94
Fatigue is a risk factor for LBIs	0	12	26	284	77	399	4.07	4	4	0.61
Ergonomic job design reduces LBIs	0	10	68	227	92	397	4.01	4	4	0.71
Bending knees, keeping back straight, and then lifting with the leg muscles prevent LBIs	0	3	2	204	190	399	4.46	4	4	0.55
Sudden unexpected factors limit the use of proper biomechanical techniques in preventing LBIs	1	20	29	244	105	399	4.08	4	4	0.74
Physical activities outside of work reduce LBIs	0	14	46	244	94	398	4.05	4	4	0.70
Stress at work or home is a risk factor for LBIs	1	24	68	256	50	399	3.83	4	4	0.73

Medical Problem

Questions were asked regarding respondents' medical conditions (Table 14). The majority of HCNs reported no medical problems (Mdn = 2; mode = 2). Nineteen percent (n=68) of respondents reported that they experienced Premenstrual Syndrome (PMS). Eleven percent (n=38) of respondents had osteoarthritis. Five percent (n=19) of HCNs had a leg-length discrepancy.

Table 14

Medical Problems of HCNs

Medical Problems	Yes	No	N
Rheumatoid arthritis	17	337	354
Diabetes mellitus	6	344	350
Pre-menstrual syndrome	68	289	357
Leg-length discrepancy	19	331	350
Osteoporosis	8	342	350
Osteoarthritis	38	312	350
Kyphosis/Scoliosis	16	335	351
Mental health problem	11	327	338

Life Styles

Moderate exercise. Three hundred and ninety-seven respondents gave input to the question asking whether they had exercise at a moderate intensity for 20 minutes at least three times a week (Table 15). One hundred and sixty-seven (42.1%) reported that they had; one hundred and sixty-one (40.6%) said occasionally; and sixty-nine (17.4%) indicated they did not exercise.

Smoking. The majority of respondents (87.2%) reported that they did not smoke. Twenty-eight of 399 HCNs (7%) and twenty-three (5.8%) indicated that they were smokers and occasional smokers respectively.

Body mass index. Respondents were asked to write down their own weights and heights and an objective assessment of obesity was made using Body Mass Index (BMI) calculations (Thompson & Wilson, 1996). Guidelines for healthy ratios are as follows: BMI less than 20 is underweight, BMI between 20 and 25 is acceptable weight, BMI between 25 and 27 is marginal overweight, and BMI more than 27 is overweight. Of 389 respondents, 54.5% (n=212) HCNs had healthy weight: height ratios, 26.2% (n=102) were overweight, 11.6% (n=45) had marginal overweight, and 7.7% were underweight (n=30) (Table 15).

Table 15

Life Style of Respondents

Life Style	**Values**				**Measures of Central Tendency**				N
	Yes (1)	Occasionally (2)		No (3)	M	Mdn	Mode	SD	
Exercise	167	161		69	1.753	2	1	0.731	397
Smoke	28	23		348	2.802	3	3	0.548	399
BMI	< 20 (1)	20-25 (2)	25-27 (3)	> 27 (4)					
	30	212	45	102	2.563	2	2	0.963	389

Job Satisfaction

Among 398 HCNs, 12.8% (n=51) reported that they were very satisfied; 42.7% satisfied; 12.1% very unsatisfied; 8% unsatisfied; and 24.4% neutral regarding satisfaction with their current job. The descriptive statistics for the overall responses for job satisfaction were: M = 3.36, Mdn = 4; mode = 4 and SD = 1.17 (Table 16).

Job Stress

Respondents were asked whether they considered their current job stressful (Table 16). Among 397 respondents, HCNs felt that their job was stressful. Fifty-nine (14.9%) reported that their job was very stressful while 132 (33.2%) stated stressful. Very few (8.1%) indicated that their job was not stressful. A large percentage of respondents (43.8%) were neutral.

Table 16

Nurses' Perceptions of Their Job Stress and Job Satisfaction

Job	Responses					Measures of Central Tendency				N
	Very Stressful/ unsatisfied (1)	Stressful/ Unsatisfied (2)	Some-what (3)	Unstressful/ Satisfied (4)	Very Unstressful/ Satisfied (5)	M	Mdn	Mode	SD	
Job Stress	59	132	174	28	4	2.46	3	3	0.87	397
Job Satisfaction	48	32	97	170	51	3.36	4	4	1.17	398

Reporting Practices for LBIs

Only twenty-five (46.3%) of the 54 respondents who had LBIs reported some or all of the injuries to their employers. The total number of LBIs reported was 21 (total LBIs were at least 79). The number of LBIs reported by individual HCNs to employers ranged from one to three (Table 7).

HCNs who had LBIs and chose to report/chose not to report some or all of these injuries were asked to indicate what they were doing when they had the injury (Table 17). Result showed that there were 28 reported LBIs and 65 not reported LBIs. The addition of 28 and 65 is 93 which is greater than 79. Perhaps the total number of LBIs in the previous 12 months would be 93.

Table 17 illustrates that HCNs chose not to report most of the LBIs. It seems that HCNs especially would not like to report the LBIs which occurred when they were: lifting a client up in bed, repositioning a client in bed, transferring a client from bed to wheelchair, and doing a dressing change.

Table 17

Nursing Activities When LBIs were Reported/Not Reported

Nursing Activities	Reported		Not Reported	
	n	%	n	%
Driving a Vehicle	2	7.14	2	3.08
Lifting a client up in bed	4	14.29	8	12.31
Repositioning a client in bed	2	7.14	7	10.77
Repositioning a client in wheelchair	3	10.71	4	6.15
Transferring a client from wheelchair to bed	3	10.71	3	4.62
Transferring a client from bed to wheelchair	2	7.14	7	10.77
Transferring a client from toilet to wheelchair	1	3.57	3	4.62
Transferring a client from wheelchair to toilet	1	3.57	2	3.08
Transferring a client from bathtub to wheelchair	2	7.14	4	6.15
Transferring materials to or from vehicle	1	3.57	5	7.69
Weighing a client	0	0.00	0	0.00
Supporting a falling client	3	10.71	4	6.15
Doing a dressing change	2	10.71	8	12.31
Doing footcare	0	0.00	5	7.69
Walking	2	7.14	3	4.62
Total	28		65	

Twenty-nine (53.7%) HCNs chose not to report the LBIs. HCNs who had LBIs and chose not to report some or all of these injuries were asked to indicate reasons why these injuries had not been reported (Table 18). The most common reason provided by nurses (26 nurses, 55.32%) was that the injury was considered not serious/not important.

Additional reasons included: a) red tape involved (7 nurses, 14.89%); b) lack of awareness of reporting procedures (4 nurses, 8.51%); fear of being reprimanded or suffering repercussions (4 nurses, 8.51%); embarrassment/personal reasons (4 nurses, 8.51%); and c) effect on safety/sick time record (2 nurses, 4.26%);

Table 18

Reasons for Not Reporting LBIs

Reasons	n	Percent (%)
Not aware of reporting procedures	4	8.51
Fear of being reprimanded or suffering repercussions	4	8.51
Embarrassment/personal reasons	4	8.51
Red tape involved	7	14.89
Effect on safety/sick time record	2	4.26
Injury not serious/not important	26	55.32
Total	47	

Near Accidents /Close Calls

Incidence of Near Accidents/Close Calls

The incidence of near accidents/close calls of LBIs in Alberta HCNs was obtained in response to the question asking HCNs whether or not they had a work-related near accident/close call for LBIs within the previous 12 months and how many, if they reported they had (Table 7). Two hundred and eighteen (54.6%) of 399 respondents reported that they had near accidents/close calls for LBIs. The number of near accidents/close calls occurring to any one nurse ranged from 1 to 48: 15.6% (n=59) had experienced one near accident/close call; 15.9% (n=60) experienced two; 5.6% (n=21) experienced three; 2.4% (n=9) experienced four; 2.1% (n=8) experienced 5 to 8; 0.3% (n=1) experienced seven to twelve; 0.3% (n=1) experienced twenty-five, and 0.3% (n=1) even had experienced forty-eight near accident/close call. Thus, the combined number of near accidents/close calls of LBIs was at least 602 within a 12 month period.

Nature of Near Accidents/Close Calls

Respondents were asked where the near-accidents/close calls happened. One hundred and fifty-one HCNs reported that near-accidents/close calls happened at the client's home. Only 53 incidents occurred at the agency. Eighty-three respondents reported that near-accidents/close calls occurred on the way to clients' homes from the agency, and that 51 incidents occurred on the way back to the agency from clients' home. Five HCNs indicated that near-accidents/close calls occurred when they transferred heavy equipment/charts/nursing bags from one place to another. For example, "transferring shoulder bag with client files, paper work from and to car into homes" was one of the typical comments. Ten respondents stated that icy/slippery road conditions were another cause of near-accidents/close calls. Six incidents were related to driving. One respondent indicated that working alone was the cause of the incidence - "taking client on my own to client's appointments. The wheelchair is very heavy and awkward. My client is also on a ventilator."

In order to understand the nature of near-accidents/close calls of LBIs, respondents were asked to describe the three most serious situations in which they had a work-related near-accidents/close calls for LBIs in home care. The three most serious conditions identified were icy/slippery streets/walkways/parade (n=106), transferring heavy equipment/charts/nursing bags (n=67), and driving (n=53). Other reported serious causes were: poor maintenance of clients' homes (n=52), lift and transfer of clients (n=51), unexpected forces (n=48), working height (n=32), slips in bathroom (n=25), dressing change (n=18), working space (n=15), client's weight (n=14), working alone (n=14), bed width (n=12), client cooperation (n=8), nonavailability of equipment (n=5), storage arrangement (n=5), work station in office (n=4), catheterization (n=4), lift/transfer with an untrained person (n=4), unsuitable equipment (n=3), poor maintenance of agency (n=3), workload (n=1), lighting (n=1), and foot care (n=1).

Respondents were also asked to describe three possible situations that could lead to a work-related near-accident/close call for LBIs in home care. The three most possible situations identified were: transferring heavy equipments/charts/nursing bags (n=101), poor maintenance of client's homes (n=98), and icy/slippery streets/walkways/parkades (n=97). Other reported possible causes were: working heights (n=85), unexpected forces (n=83), driving (n=73), lift and transfer of clients (n=61), working space (n=44), slips in bathroom (n=44), working alone (n=42), equipment availability (n=35), client cooperation (n=35), lifting/transferring techniques (n=34), clients' weight (n=24), dressing change (n=23), bed widths (n=17), equipment not appropriate (n=13), pet (n=10), workload (n=10), equipment not maintained and/or not in working condition (n=8), footwear (n=7), footcare (n=7), client strength (n=7), lighting (n=6), storage arrangement (n=6), work station (n=4), lift/transfer with an untrained person (n=3), catheterization (n=3), back strains (n=2), HCNs not at risk (n=1), and inappropriate equipment (n=1).

Organizational Resources

Respondents were asked whether they knew of any organizational resources, such as programs, written policies and procedures, orientation, and ongoing inservices in their agencies. Over 90% of the 400 respondents responded. The majority of respondents reported that they either did not have the resources or they did not know the existence of the resources.

Programs

Respondents were asked if their employers had occupational health nurses, back injury prevention programs, occupational health and safety programs, and/or joint occupational health and safety committees (Table 19). One open-ended question was provided to get additional information. Two hundred and twelve HCNs (54.6%) reported that their agencies did not employ an occupational health nurse. Fifty-seven respondents (14.7%) stated that they were not sure whether there was an occupational health nurse in their agencies. Similarly, 188 (48%) of the nurses reported that their facilities did not offer a back injury program; 81 HCNs (20.7%) were not sure. Only 107 nurses (27.9%) indicated that their agencies offer an occupational health and safety program; 109 nurses (28.4%) were not sure. Even less than this, 99 HCNs (25.9%) identified that their organizations had joint occupational health and safety committees, 123 nurses (32.2%) were not sure.

Table 19

Components of Organizational Resources Programs

Component	Responses			N	Measures of Central Tendency			
Programs	Yes	No	Unsure		M	Mdn	Mode	SD
An occupational/employee health nurse	119	212	57	358	1.84	2	2	0.66
Back injury prevention program	123	188	81	392	1.89	2	2	0.71
Occupational health and safety program	107	168	109	384	2.00	2	2	0.75
Joint occupational health and safety committee	99	160	123	382	2.06	2	2	0.76

Written Policy or Procedure

Respondents were asked to indicate whether their organizations had written policies or procedures regarding LBI prevention (Table 20). Not all agencies had a written reporting policy. Two hundred and fifty-nine (66.1%) of 392 nurses reported that their employers had policies and procedures to guide employees in reporting back injuries during the day; 191 (48.8%) of 391 nurses stated that they had policies to guide them in reporting back injuries after the day shift or on weekends; however, only 62 nurses (15.2%) showed that they had near-accidents/close calls reporting policies in their agencies. One hundred and nineteen (30.4%) of 391 respondents reported that they had follow-up policies for staff members who experienced a back injury. However, only 47 (11.5%) of 389 nurses reported that they had follow-up policies for near-accidents/close calls. With respect to return to work following injury, 136 (35%) of 389 respondents reported that they had this written policy/procedure. Seventy (18.1%) of 387 respondents reported pre-employment health assessment in their agencies. Two hundred and forty-one

(61.5%) of 392 respondents stated that they had a smoking policy in their organization. Two hundred and sixty-two (67.9%) of 386 nurses reported that their agencies had safety policies and procedures for employees. Only 125 (32.3%) of 387 respondents stated they had occupational health and safety policies and procedures.

Table 20

Components of Organizational Policies and Procedures

Component	**Responses**			**N**	**Measures of Central Tendency**			
Written Policy/Procedures	**Yes**	**No**	**Unsure**		**M**	**Mdn**	**Mode**	**SD**
Reporting of back injuries during the day	259	44	89	392	1.57	1	1	0.84
Reporting of back injuries after day shift or on weekends	191	68	132	391	1.85	2	1	0.90
Follow-up for the staff member who experiences a back injury	119	74	198	391	2.20	3	3	0.88
Reporting of near-accidents/close calls	62	183	146	391	2.21	2	2	0.70
Follow-up for near-accidents/close calls	47	183	159	389	2.29	2	2	0.67
Safety policies and procedures	262	43	81	386	1.53	1	1	0.82
Pre-placement health assessment	70	208	109	387	2.10	2	2	0.67
Occupational health and safety	125	108	154	387	2.07	2	3	0.85
Return to work following injury	136	71	182	389	2.12	2	3	0.90
Smoking	241	60	91	392	1.62	1	1	0.84

Orientation

Respondents were asked if their employers provided an orientation for some of the back protection programs (Table 21). The majority of respondents indicated that they either did not have an orientation or they were not sure whether they had an orientation. The results were: lifting/transferring techniques (yes = 48.7%; no = 38.1%; unsure = 11.7%); lifting/transferring devices (yes = 41.8%; no = 45.3%; unsure = 12.9%); reporting procedures for LBIs (yes = 44.3%; no = 32.4%; unsure = 23.3%); reporting near-accidents/close calls (yes = 15.4%; no = 54.4%; unsure = 30.1%); driving safety (yes = 17.5%; no = 69.6%; unsure = 12.9%); back care protection (yes = 37.6%; no = 47.3%; unsure = 15.1%); worker's compensation procedures (yes = 48.2%; no = 34%; unsure = 14.7%); occupational health and safety services (yes = 24.9%; no = 47.1; unsure = 28%); and workplace health and safety hazards (yes = 33.2%; no = 38.8%; unsure = 27.9%). More than half (62.6%) of the respondents indicated that they had medical, disability, dismemberment, and life insurance.

Table 21

Components of Organizational Orientations

Components	**Responses**			**N**	**Measures of Central Tendency**			
Orientation	**Yes**	**No**	**Unsure**		**M**	**Mdn**	**Mode**	**SD**
Lifting/transferring techniques	192	156	46	394	1.63	2	1	0.68
Lifting/transferring devices	165	179	51	395	1.71	2	2	0.68
Reporting procedures for LBIs	175	128	92	395	1.79	2	1	0.80
Reporting of near-accidents/close calls	61	215	119	395	2.15	2	2	0.66
Driving safety	69	275	51	395	1.95	2	2	0.55
Back care protection	147	185	59	391	1.78	2	2	0.69
Medical, disability, dismemberment, and life insurance	246	89	58	393	1.52	1	1	0.74
Worker's compensation procedures	197	139	58	394	1.65	1.5	1	0.72
Occupational health and safety services	98	185	110	393	2.03	2	2	0.73
Workplace health and safety hazards	131	153	110	394	1.95	2	2	0.78

Ongoing Inservices

Respondents were asked whether their employers provided an ongoing inservice for the orientation topics. Results showed that more than 50% of the respondents reported that their employers did not provide ongoing inservices on all the orientation topics (Table 22). In other words, all orientation programs were one time training and no follow-up programs were conducted. The results were: lifting/transferring techniques (yes = 32.2%; no = 57%; unsure = 10.7%); lifting/transferring devices (yes = 28.3%; no = 60.9%; unsure = 10.8%); reporting procedures for LBIs (yes = 20.2%; no = 63.4%; unsure = 16.4%); reporting near-accidents/close calls (yes = 8.7%; no = 72.3%; unsure = 19%); driving safety (yes = 9.5%; no = 77.6%; unsure = 12.9%); back care protection (yes = 23.3%; no = 62.8%; unsure = 13.8%); medical, disability, dismemberment, and life insurance (yes = 23.7%; no = 62.6%; unsure = 13.7%); worker's compensation procedures (yes = 19.9%; no = 66%; unsure = 14.1%); occupational health and safety services (yes = 12.4%; no = 68.3%; unsure = 19.3%); and workplace health and safety hazards (yes = 20.3%; no = 63%; unsure = 16.7%).

Table 22

Components of Organizational Ongoing Inserviecs

Component	**Responses**			**N**	**Measures of Central Tendency**			
Ongoing Inservices	**Yes**	**No**	**Unsure**		**M**	**Mdn**	**Mode**	**SD**
Lifting/transferring techniques	126	223	42	391	1.79	2	2	0.62
Lifting/transferring devices	110	237	42	389	1.83	2	2	0.60
Reporting procedures for LBIs	79	248	64	391	1.96	2	2	0.60
Reporting of near-accidents/close calls	34	282	74	390	2.10	2	2	0.52
Driving safety	37	302	50	389	2.03	2	2	0.47
Back care protection	91	245	54	390	1.91	2	2	0.60
Medical, disability, dismemberment, and life insurance	92	243	53	388	1.90	2	2	0.60
Worker's compensation procedures	78	258	55	391	1.94	2	2	0.58
Occupational health and safety services	48	265	75	388	2.07	2	2	0.56
Workplace health and safety hazards	79	245	65	389	1.96	2	2	0.61

Relationship Between the Occurrence of LBIs and Environmental Factors

Chi-square analysis indicated that the occurrence of LBIs was associated with some environmental risk factors. Home care nurses who had LBIs tended to perceive the following as high risk factors: (1) poor storage arrangement ($\chi^2 = 8.38$, $p = 0.015$); (2) obstacles in the physical working environment ($\chi^2 = 15.015$, $p = 0.001$); (3) equipment wrong size ($\chi^2 = 7.984$, $p = 0.018$); (4) equipment hard to move through cramped spaces ($\chi^2 = 7.838$, $p = 0.02$); (5) lack of equipment ($\chi^2 = 6.973$, $p = 0.031$); (6) floor surface ($\chi^2 = 4.732$, $p = 0.03$); and (7) workstation in office ($\chi^2 = 6.091$, $p = 0.048$).

Relationship Between the Occurrence of the LBIs and Nurse Factors

Chi-square analysis showed that the occurrence of LBIs was associated with some nurse risk factors. Home care nurses who had LBIs perceived the following as high risk factors: (1) fatigue level ($\chi^2 = 8.79$, $p = 0.012$); (2) insufficient knowledge in lifting/transferring techniques ($\chi^2 = 8.05$, $p = 0.045$); and inadequate staff-patient ratio ($\chi^2 = 12.602$, $p = 0.002$).

Relationship Between the Occurrence of the LBIs and Client Factors

Chi-square analysis illustrated that the occurrence of LBIs was associated with some client risk factors. Home care nurses who had LBIs tended to rate the following client factors as high risk: (1) weight ($\chi^2 = 8.953$, $p = 0.03$); (2) height ($\chi^2 = 8.341$, $p = 0.015$); (3) fatigue level ($\chi^2 = 8.107$, $p = 0.017$); and (4) cooperation ($\chi^2 = 8.225$, $p = 0.016$).

Relationship Between the Occurrence of the LBIs and Organizational Factors

Chi-square analysis also found that the occurrence of LBIs was associated with some organizational factors. Home care nurses who had LBIs tended to report that their agencies did not have the following resources: (1) written policy/procedure on reporting of back injuries during the day ($\chi^2 = 10.737$, $p = 0.005$); (2) smoking policy/procedure ($\chi^2 = 6.51$, $p = 0.039$); (3) orientation program on reporting procedures for LBIs ($\chi^2 = 22.217$, $p = 0$); (4) orientation program on medical, disability, dismemberment and life insurance ($\chi^2 = 9.612$, $p = 0.008$); (5) orientation program on worker compensation board procedures ($\chi^2 = 7.791$, $p = 0.02$); (6) orientation program on occupational health and safety services ($\chi^2 = 6.807$, $p = 0.033$); (7) ongoing inservice on medical, disability, dismemberment, and life insurance ($\chi^2 = 6.594$, $p = 0.037$); and ongoing inservice on reporting procedures for LBIs ($\chi^2 = 7.520$, $p = 0.023$).

Relationship Between the Occurrence of LBIs and HCNs' Personal Characteristics

Table 23 shows the relationship between years of nursing practices and the occurrence of LBIs among HCNs using the Pearson product-moment correlation. The years of nursing practice in nursing and in home care were seen to be associated with the occurrence of LBIs. A statistically significant relationship existed between the number of years of nursing practice and the LBIs occurrence ($r= 0.113$, $p=0.025$). The more years of nursing practice the more likely HCNs did not have a LBI. A statistically significant relationship was also found between the number of years of nursing practice in home care and LBIs occurrence ($r=0.102$, $p=0.043$). The more years of nursing practice in home care the more likely HCNs did not have a LBI. No significant relationship was observed between the occurrence of LBIs and life style practices; i.e., exercise and smoking. Low back injury occurrence also did not have an association with job satisfaction, job stress, gender, hours of work, respondents' age, weight, and height.

Table 23

Relationship Between the Occurrence of LBIs and HCNs' Years of Nursing Practices

	Years of Nursing Practice		Years of Nursing Practice in Home Care	
	r	p	r	p
The Occurrence of LBIs	0.113*	0.025	0.102*	0.043

* Correlation is significant at the 0.05 level

Relationship Between the Occurrence of LBIs and Previous LBIs

Table 24 illustrates the relationship between LBIs occurring prior to the last 12 months and within the previous 12 months using the Pearson product-moment correlation. There was a positive statistically significant relationship between them (r=0.286, p=0.000). Home Care Nurses who had previous LBIs were prone to have LBIs again.

Table 24

Relationship Between the Occurrence of LBIs and Previous LBIs

	LBIs prior to the last 12 months	
	r	p
The Occurrence of LBIs	0.286**	0.000

** Correlation is significant at the 0.01 level

Relationship Between the Occurrence of the LBIs and LBI Knowledge

Chi-square analysis indicated that HCNs who had LBIs would tend to agree that sudden unexpected factors limit the use of proper biomechanical techniques in preventing LBIs ($\chi^2 = 18.588$, $p = 0$).

Relationship Between the Occurrence of the LBIs and Age

Chi-square analysis found that HCNs who had LBIs were most frequently between the ages of 18 to 34 years ($\chi^2 = 7.872$, $p = 0.02$).

Relationship Between the Occurrence of the LBIs and Activities Outside Work

Chi-square analysis revealed that HCNs who had LBIs tended to spend their leisure time on shopping ($\chi^2 = 5.446$, $p = 0.02$).

Relationship Between Risk Factors/Behaviors and Reporting Practices for LBIs

Table 25 illustrates the relationship between risk factors/behaviors and reporting practices for LBIs that were found to be statistically significant. Pearson r correlation was used to determine whether there was a difference between those who reported and those who did not report their LBIs within the previous 12 months with respect to the risk factors/behaviors. Analysis showed that most of the relationships were not statistically significant. Only 4 risk factors/behaviors had a statistically significant relationships with the reporting practices. They were lighting (environmental factor), clients' body awareness (client factor), and frequency of using biomechanical techniques (individual factor). An inverse relationship was demonstrated between lighting and reporting practices ($r=-0.367$, $p=0.007$). Home Care Nurses who perceived lighting as a high risk factor for LBIs would likely report their LBIs. A statistically significant positive relationship existed between the reporting practices and clients' body awareness. Home Care Nurses who perceived clients' body awareness as a high risk factor for LBIs would likely not report their LBIs. The frequency of using biomechanical techniques for preventing LBIs was seen in association with the reporting practices among HCNs ($r=0.296$, $p=0.032$). Home Care Nurses who frequently used biomechanical techniques for preventing LBIs were more likely to report their LBIs to agencies.

Table 25

Significant Relationships between Risk Factors/Behaviors and the Reporting Practices

	Lighting		Body Awareness		Frequency of Using Biomechanical Techniques	
	r	p	r	p	r	p
Reporting Practices	-0.367**	0.007	0.270*	0.048	0.296*	0.032

* Correlation is significant at the 0.05 level
** Correlation is significant at the 0.01 level

Relationship Between the Organizational Resources and the Reporting Practices

Table 26 depicts some of the associations found between the organizational resources of Alberta home care agencies and the reporting practices among Alberta HCNs. Relationships were found between the reporting practices and some written policies/procedures, but no associations were found with orientation and ongoing inservice programs. Home Care Nurses' reporting practices had a positive relationship with written policies/procedures with regards to reporting back injuries during the day ($r=0.409$, $p=0.003$), and after day shift or on weekends ($r=0.299$, $p=0.033$). Home Care Nurses were more likely to report their LBIs if their agencies had back injury reporting policies and procedures. A follow-up for the staff member who experiences a back injury policy/procedure had a positive relationship with the reporting practices ($r=0.312$, $p=0.026$). Home Care Nurses were more likely to report their LBIs if their agencies had back injury follow-up policy/procedure. Agencies' safety policies and procedures also had an association with HCNs' reporting practices ($r=0.290$, $p=0.039$). Home Care Nurses were more likely to report their LBIs if their agencies had a safety policy and procedure.

Table 26

Significant Relationships between Organizational Resources and the Reporting Practices

	Reporting During the Day		Reporting After Day Shift/Weekends		Follow-up After Back Injury		Safety Policies & Procedures	
	r	p	r	p	r	p	r	p
Reporting Practices	0.409**	0.003	0.299*	0.033	0.312*	0.026	0.290*	0.039

* Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

CHAPTER FIVE

Discussion of Findings

This study was designed to explore the incidence, risk factors/behaviors, organizational resources, reporting practices, and nature of near-accidents/close calls related to low-back injuries (LBIs) in Alberta home care nurses (HCNs). Relationships among risk factors/behaviors, the organizational resources, and the reporting practices for LBIs were reviewed. Data were obtained in response to 42 items on the Home Care Nurses' Low-Back Injury Questionnaire (HHNLBIQ) consisting of both open-ended and fixed format questions. Items elicited demographic data and data pertaining to LBIs. Section I had 3 risk factors/behaviors questions. Section II contained 11 items related to incidence, reporting practices, and risk factors/behaviors for LBIs. Section III had 4 near-accident/close call questions. Section IV involved 4 resource items, and section V had 20 demographic questions.

Of the 1114 surveys mailed, 409 HCNs returned their questionnaires. Nine respondents returned the questionnaires unanswered: four respondents stated that they were no longer working with home care; three were not doing direct client care; one was on disability leave; and one had too many other commitments and felt the questionnaire was very long and involved. Four hundred HCNs returned at least 90% completed questionnaires. At least 97% of the respondents provided completed answers on sections I to IV. It seemed that some respondents hesitated to provide demographic information. Eleven respondents refused to write down their weights and one respondent commented that was "none of your business". As few as 338 respondents provided their medical conditions. Respondents might have difficulty disclosing their personal information to a stranger. Four respondents did not indicate which Alberta Regional Health Authority (ARHA) they worked in. Some ARHAs, such as Northwestern, might have only a few HCNs. Those HCNs might not feel comfortable answering some of the questions because of anonymity and confidentiality issues. Respondents therefore chose not to provide some of the information for various reasons; hence the response rate for each question varied.

Four hundred HCNs returned "completed" questionnaires, for a response rate of 35.9%. The low response rate could be due to several contributing factors. Changes in the Alberta health care system have resulted in a massive layoff of Registered Nurses (RNs). Some nurses who lost faith in the Alberta health care system moved to other countries, such as the United States. The researcher received 2 phone calls from respondents' families who kindly informed her that respondents had gone to the United States to work. One respondent returned an incomplete questionnaire and wrote that she/he was no longer employed in home care. Also, the high unemployment rate might reduce nurses' interest in research. Another possible obstacle to HCNs returning the questionnaire is their perception of a low risk for LBIs among HCNs. One nurse stated that "nurses in our program provide less direct service. We do mainly assessment and authorizations. Our home support workers are at a much greater risk for LBIs". Another nurse wrote that, " the support workers on our home care team are probably the ones more at risk for LBI as they do the majority of personal care. Personally, I find my work more a strain on my shoulder because of the need for frequent lifting of heavy nursing bag and equipment in and out of the vehicle." Nurses might choose not to return the questionnaire if they did not perceive a high risk for LBIs in HCNs, especially when they were busy. The fourth possible explanation could be simply too much present research focusing on home care. Respondent fatigue could be a factor because other research was conducted with the same population a few months earlier. One nurse wrote "I do not wish to do any more questionnaires. I am working very casually. I no longer should encounter work-related injuries." The fifth possible reason for the low response rate might be due to mailing error. One nurse reported that he/she did not receive the first questionnaire, but did receive the postcard reminder. Finally, the time that the questionnaire was sent out was not appropriate. Questionnaires were sent to HCNs around Christmas time. Some HCNs returned questionnaires late because of being too busy at Christmas. One respondent commented that "completing questionnaire at Christmas time is very difficult".

The study results can be generalized to the target population, Alberta HCNs, even though the response rate was considered low. First, the total population was used in this survey; hence, each HCN in the population had an equal chance of being selected. This reduced the possibility of bias in sampling and ensured a more representative sample (Brink & Wood, 1994). Second, the returned questionnaires covered all 17 (100%) ARHAs. The response rates from each region were in similar proportion as they appeared in the population. This suggests that the sample covered wide geographic areas of Alberta home care agencies. Third, demographic data collected from this survey were comparable with Hanrahan's (1996). Hanrahan (1996) conducted a sharps injury study in the same population, all Alberta HCNs. Her study's response rate was 63.4% (n = 654). Demographic data such as age, gender, years of nursing experience, and current nursing positions were not collected in Hanrahan's study. The only comparable category was level of nursing education. The responses of these two studies were similar: (1) a

Registered Nursing diploma was the highest educational level achieved of 58% of respondents in Hanrahan's study (1996) while 57.43% in this study; (2) 37.3% had a baccalaureate degree in nursing in Hanrahan's study (1996) while 39.04% in this study; and (3) 1.3% had Master's degree in nursing in Hanrahan's study (1996) while 1.51% in this study. This comparison suggests that the sample was representative.

Incidence of LBIs

All 400 respondents provided answers to the question, "Within the last 12 months, have you had a work-related LBI?" Fifty-four respondents reported that they had LBIs in the previous year and 346 reported that they did not have LBIs. Fifty-four HCNs reported that they experienced a combined total of 79 LBIs within the previous 12 months. The number of LBIs occurring to any one nurse ranged from 1 to 5 times. This indicates that 13.5% (n=54) of the sample had experienced LBIs. Moreover, the incidence of LBIs in this survey was 19.8%.

Apparently, the number of LBIs indicated in this study was higher than studies done by Skarplik (1988), Smith and White (1993), Massi-O'Malley (1993), and Myers et al. (1993). Comparison of this study's results with the literature should be taken with great caution. Smith and White (1993) found that 58 directors of home care agencies in counties of Northern California reported 23 back injuries in the period from July 1990 to June 1991. A specific study focusing only on Home Health Aides (Myers et al., 1993) was conducted in two largest home health care agencies in the Baltimore-Washington area. Fifty six LBIs were reported in the 3-year period 1984-1986. However, no information was given regarding the sample size. The incidence rate could not be calculated without that information. Hence, no comparison of Smith and White's (1993), or Myers et al.'s (1993) studies with this study could be performed.

In 1988, Skarplik found that the incidence rate of back injuries among the community nursing staff in Oxford was 35.9% (n=14). Another study done by Massi-O'Malley (1993) in a Florida company with 600 employees in eight regional offices, reported 3 back injuries related to patient care in the fiscal year 1991-1992. This provided an incidence rate of 0.5%. However, the reported back injuries of these two studies involved direct care employees, that is, RNs, home health aides/attendants, and other field staff. Thus, the number of LBIs among RNs could be lower than the study results. From the results of Skarplik (1988) and Massi-O'Malley (1993), it is reasonable to believe that the incidence of back injuries involving only HCNs could be the same or lower than the research finding. In addition, this study involved the total population of Alberta HCNs. Thus, it is possible to believe that the number of LBIs among Alberta HCNs was at least 79 within the previous 12 months. The number of LBIs indicated by the HCNs in this Alberta study was higher than the actual reported data in the literature. Perhaps the low incidence rate shown in the literature underestimates the true number of LBIs. Injured employees might choose not to report the incidents to the agencies for various reasons (Levy & Wegman, 1995).

Incidence of Near-Accidents/Close Calls for LBIs

The responses of the study indicated that 13.5% (n=54) HCNs had experienced at least 79 LBIs in the previous 12 months. One might believe that the risk of LBIs among HCNs was low based on this result. However, attention must be paid to the incidence of near-accidents/close calls for LBIs. A close look at the incidence of near-accidents/close calls for LBIs merits discussion. The total combined number of near-accidents/close calls for LBIs among HCNs was at least 602 within the previous 12 months. Hence, the incidence of worked-related near-accidents/close calls in this survey was 150.5%. One has to remember that injury is only the tip of the iceberg (Bird & Germain, 1986). The landmark of 1-10-30-600 ratio (Bird & Germain, 1986) has a significant implication for this study. In 1969, a landmark safety study of industrial accidents revealed that, for every reported major injury (resulting in death, disability, lost time or medical treatment), there were: (1) 10 reported minor injuries, (2) 30 property damage accidents, and (3) 600 near-accidents/close calls (Bird & Germain, 1986). The number of near-accidents/close calls (602) was considerably greater than the actual number of LBIs (at least 79) which occurred. The great number of near-accidents/close calls of LBIs indicated that the risk of LBIs among HCNs was high. This was supported by the finding that 90.4% of respondents considered the risk of LBIs as a problem in home care. Although many research studies have been conducted to find solutions for LBIs mainly in the manufacturing and institutional health industries, no study has been done to investigate the near-accidents/close calls for LBIs. Ignoring this element in LBI prevention programs may be problematic. Investigation of the near-accidents/close calls could provide valuable information to prevent future LBIs.

Risk Factors/Behaviors for LBIs

Understanding the risk factors/behaviors for LBIs, specifically in the home care setting is a prerequisite to the development of schemes for safe workplace designs and placement of HCNs in jobs that do not compromise health and safety. The literature review showed that no study has been done to explore the risk factors/behaviors for LBIs among HCNs. A great deal of related research has been done on hospital-based and nursing home nurses. Careful review of this research reveals some pertinent information. Non-occupational and occupational risk factors/behaviors for LBIs were identified in institutional settings. Non-occupational factors identified were: age, gender, physical fitness, previous history of LBIs, work experience, fatigue level, obesity, and smoking. Occupational factors identified were: lifting and transferring (Alberta Labour, 1993; Charney, et al., 1993; Garg & Moore, 1992a; Garg & Owen, 1992; Garrett et al., 1992; Harvey & Lyons, 1993), prolonged and repetitive tasks (Kumar, 1990a; 1989; 1994; Garg & Owen, 1992; Garg et al., 1992; Owen & Garg, 1991; Torma-Krajewski, 1987), lifting alone (Alberta Labour, 1993; Lagerlof & Broberg, 1989), bent-over posture (Alberta Labour, 1993), slipping, tripping, sudden unexpected load on the back (Lagerlof & Broberg, 1989; Garg & Moore, 1992a), and driving (Walsh et al., 1989). Do HCNs face the same risk factors for LBIs as nursing personnel in institutions? What are the unique risk factors/behaviors for LBIs among HCNs?

Environmental Factors

The responses showed that environmental factors which contributed to LBIs among HCNs could be classified into 2 types, that is, environmental factors inside and outside of clients' homes and/or nurses' office.

Working height. Respondents were asked to indicate the relative seriousness of the environmental factors inside clients' homes and/or nurses' office for LBIs in home care. Working height was considered the highest risk factor. This finding is consistent with Skarplik's (1988) results. Most home care clients preferred to use their own beds rather than hospital beds. The height of non-hospital beds was not adjustable. Home care nurses could not adjust the height to waist level when they performed lifts or transfers.

Rowe (1983) has identified bent-over posture as a risk factor for LBIs. In institutional settings, nurses might choose not to adjust the height of the bed when they are doing certain nursing procedures. However, in home care settings, nurses have no alternative but to bend over to perform most nursing procedures. Respondents expressed repeatedly that low bed, low armchair, low sofa, low bathtub, and other low furniture created a high level of postural stress on their back. Owing to the working height, HCNs had to bend over to perform numerous nursing tasks such as bath assessment, dressing change, footcare, catheterization, and lifting/transferring.

Bed width. The second highest risk factor identified in clients' homes was bed width. This result supports Skarplik's (1988) findings. Again, in the institutional setting, the width of beds is standardized to prevent unnecessary stretching. Ergonomic design of the bed is more important than width preference in the institutional settings. However, home care clients choose a bed that is comfortable for them. Respondents indicated that some clients had king or queen size beds at home. Home care nurses had no choice but to stretch their backs to perform even a simple nursing procedure.

Working space. The third highest risk factor in clients' homes was working space. Responses from the open-ended questions described the working environment in home care: "Crowded cramped rooms with junk all over"; "Small areas in bathroom lead to awkward positions in giving care and assisting clients"; "Unable to use biomechanical techniques due to wide bed, cramped quarters"; "Cramped working space necessitate[s] setting up [the] procedure tray in less than [an] ideal location with [the] result that you either: I) do additional twisting and bending or ii) put additional forces on the lumber spine because you aren't working as close to client as would be the ideal"; and "A lot of bending and lifting in cramped area." These findings were consistent with Hempel's (1993) observation. The fourth highest risk factor, equipment hard to move through cramped spaces, corresponded to the limited working space. These two risk factors were identified in Skarplik's (1988) study. The majority of HCNs considered storage arrangement and obstacles as low to medium risk factors for LBIs. However, HCNs who experienced LBIs were somewhat more likely to perceive these two as high risk factors for LBIs. A simple explanation of these observations could be that HCNs' LBIs were related to these two environmental factors. Moreover, poor storage arrangements and more obstacles created limited working space. The majority of respondents considered limited working space as a high risk factor while HCNs who had LBIs specified that poor storage arrangements and obstacles could be the cause of their LBIs.

Lack of equipment. The fifth highest risk factor in clients' homes was lack of equipment. In the institutional setting, there are different kinds of equipment available for lifts/transfers. Home care nurses, however, had to "stretch their back because of no equipment in the home". One respondent stated that "nurse physical exhaustion and then trying to move patients with no equipment and from low furniture " was a factor. In some situations, nurses had "to assist clients prior to equipment being placed in home". Another nurse commented that "[it was] attempting [a] difficult lift with no equipment or assistance. This is often faced as a dilemma by home care nurses - you end up refusing or doing it against good judgement". In some cases, the "client was categorized as a weight-bearing transfer but has deteriorated and nurse not aware". Respondents were asked if they used any lift/transfer devices when they had work-related LBIs. Sixty-eight percent of respondents indicated that they did not use lift/transfer devices because they were not available. It is not surprising to find equipment not maintained, equipment wrong size/awkward to operate, or unsuitable equipment in the home environment. As well, equipment ordered for home care was tailored for a particular client. It is interesting to examine the relationship between the occurrence of LBIs and the environmental risk factors. Results showed that there was a trend for HCNs who had LBIs to be somewhat more likely to perceive equipment wrong size/awkward to operate as a high risk factor. Perhaps it is because advances in technology could not keep up with the rapid growth of home care. Equipment such as lift/transfer devices which are suitable for the "unlimited" space in the institutional settings might not be adequate in the "limited" client's home setting. Hence, HCNs had to operate equipment in an awkward position, which could be the cause of LBIs. Future equipment designs for home care should include ergonomic features to ensure easy operation. For example, equipment that can be rolled on carpets/rugs, equipment that requires limited physical exertion of the caregiver, and a safety design which allows the device to fold up for storage in confined areas.

Handling materials. Also, HCNs not only had to lift clients (human loads), but also had to handle inanimate loads, such as equipment, nursing bags, incontinent supplies, and charts. One typical comment was, "moving equipment alone in and out of vehicles, and up and down homes [stairs]- RN delivers, installs, and returns AADL equipment". Equipment might include hospital beds, wheelchairs, scales, bath tub lifts, commodes, and bathchairs. Thus, respondents identified handling inanimate loads as risk factors for LBIs, which is a risk factor unique to home care.

Poor maintenance of clients' homes. Although the majority of the respondents considered floor surfaces as a low to medium risk factor for LBIs, HCNs who experienced

LBIs tended to perceive it as a high risk factor for LBIs. Poor maintenance of client's homes was identified as one of the three possible situations that could lead to a work-related near-accident/close calls for LBIs in home care. For example, "small scatter rugs", "wet area on floor", "broken steps", "uneven floor surfaces", and "loose carpet" were described by HCNs as their poor working environment at some clients' homes.

Pets. Pets at clients' homes were identified as a risk factor for LBIs in home care. Twelve respondents reported pets as risk factors for near-accidents/close calls for LBIs. One nurse commented on "nearly falling in a client's farm yard when dog chasing and tripped on a loose wire in the grass"; another nurse on "falling over or tripping over a pet with bags in my arms"; and yet another on "performing transfers and family pets interfere". In the institutional setting, pets are seldom considered as a risk factor for LBIs. However, in home care settings, pets could be part of the family in the clients' homes. Skillen's study (1996) on public health nurses also found that dogs on clients' property were one of the most frequent safety hazards.

Work station. The work station in the office was categorized as the lowest risk factor. There are two possible explanations. Ergonomic job design is very popular nowadays. Eighty percent of respondents agreed that an ergonomic job design could reduce LBIs. New home care offices could be designed based on ergonomics. Another possible explanation is that nurses considered physical lifting/transferring as a high risk for LBIs. Sitting in an office is not perceived as a high risk for LBIs among nursing professionals. Some nurses commented that "nurses in our program provide less direct service. We do mainly assessment and authorizations. Our home support workers are at much greater risk for low back injury". However, one nurse stated that "poor chairs, that is, no back support and wrong height" created the potential for near-accident/close call for LBI in home care. Physical handling of clients is a risk for LBIs among nursing professionals; however, prolonged sitting and postural fatigue are also believed to be triggers for LBIs (Anderson et al., 1995; Garg & Moore, 1992a). Hence, it was not surprising to observe that HCNs who experienced LBIs were more likely to perceive work station in office as a high risk factor for LBIs.

Driving and poor road conditions. Environmental risk factors outside clients' home or nurses' office were identified using open-ended questions regarding near-accidents/close calls. General categories were identified in respondents' comments. Overall, slips and falls, driving, car accidents and slippery road conditions were considered to be the most serious environmental factors which contributed to near-accidents/close calls for LBIs. These findings support Stephany's (1993) study. Unlike hospital nurses, HCNs spent a lot of their time outdoors. They had to drive from one place to the other. Walsh et al. (1989) found that driving a car more than four hours a day was associated with back problems. To compensate for these travel-related LBIs, Skillen (1996) recommended proactive management, such as in-service programs on defensive driving. Stephany (1993) suggested that agencies should provide HCNs with agency vehicles and regular maintenance. All these interventions are under organizational rather than individual control.

Nurse Factors

Working alone. The three highest risk factors at an individual nurse level were nurses' fatigue level, fitness level, and staff-patient ratio. Fatigue level (Kumar, 1994) and fitness level (Garg & Moore, 1992a; Tsai, et al., 1992) were identified as non-occupational risk factors for LBIs in the literature. In the home care setting, most of the time "a client who is defined as 2 person transfer being transferred by 1 person". Home care nurses worked by themselves without assistance. Working alone was one risk factor for LBIs identified in Skarplik's (1988) study. In hospitals, safety policy and procedure emphasize a 1-person transfer, 2-person transfer, or use of mechanical lift. However, in home care, the HCN was the only person to deal with a 2-person transfer or mechanical lift. Working alone was also identified as a risk factor for near-accidents/close calls for LBIs in home care. Most times, HCNs had to "move [a] heavy client alone since no other option [is] available". One nurse commented that "a very obese lady fell onto the floor prior to the home visit by home care nurse - and she lived in a senior citizen home, and no one is available to assist the nurse to get the client up". In home care, it was rare to have 2-person transfers or use of a mechanical lift because the staff-patient ratio was 1:1. When HCNs visited their clients, family members, sometimes, would be around and they might be willing to assist the lift/transfer. However, family members who did not have proper training could be a risk factor for LBIs. Seven HCNs commented that lifting and transferring a client with a family member who was not skilled and experienced was a risk factor for near-accident/close call for LBIs. Lack of assistants in home care also makes HCNs have no choice but to deal with unpredictable situations, such as falls or slips on their own. Working alone increases HCNs' fatigue level. Increasing staff is a management issue. Agencies could also provide car phones to each HCN so that he/she could communicate with team members if necessary.

Age and home care nursing experience. Responses indicated that work clothing, age, drug/alcohol use, footwear, use of equipment, assessment prior to task, and knowledge of lifting were considered low risk for LBIs. Except for age, all other factors were controllable. There was a trend for HCNs who had LBIs to be from 18 to 34 years of age. Review of the literature showed that LBIs occurred most frequently in workers between 25 to 44 years of age (Erdil et al., 1994; Haggar-Guemette & Proulx, 1993). This discrepancy would be due to the gender differences. This study involved 99.5% female respondents while most of the ergonomic studies were done in the male-dominated manufacturing industries. Besides gender differences, lack of home care experience could be one of the risk factors for LBIs in this age group. Analysis of the correlation between the occurrence of LBIs and the nursing experience in home care ($r = 0.102$, $p = 0.043$) supported this argument. The Alberta community-based nurse survey (Alberta Health, 1991) also showed that younger nurses joined home care services. Demographic data indicated that there was no HCN under 25 years old in the 1991 study (Alberta Health, 1991). Twelve respondents (3%) aged from 18 to 24 were found in the present study.

Previous history of LBIs. Review of literature indicated that previous history of LBIs was one of the most reliable predictive risk factors for subsequent LBIs (Agnew, 1987; Alberta Labour, 1993; Erdil el al., 1994; Garg & Moore, 1992a; Stubbs, 1991; Troup et al., 1987; Venning et al., 1987). Similar results were found in this survey. The occurrence of LBIs was associated with previous LBIs ($r = 0.286$, $p = 0$). Employment pre-selection is one of the LBI prevention strategies. Week et al. (1991) indicated that this approach might be appropriate for nursing jobs which were difficult to design and control. Pre-placement screening, health history, and physical examination are essential to detect risk factors as well as preexisting conditions. In addition, results from the pre-employment assessment could be used to provide counselling for preventing future LBIs and improving physical fitness as well. Assignment to specific jobs would then be made according to individual physical ability.

Sudden unexpected factors and lifting/transferring techniques. The results of this study showed that HCNs were very knowledgeable about how to prevent LBIs. However, 34 HCNs identified improper use of biomechanical techniques as one of three possible situations that could lead to a work-related near-accident/close call for LBIs in home care. Also, one respondent commented that "lack of practice leads to improper use of biomechanical techniques". The majority of respondents (87.5%) and HCNs who experienced LBIs agreed that sudden unexpected factors limited the use of proper biomechanical techniques in preventing LBIs. In response to the question of "how often do you use biomechanical techniques for preventing LBIs", only 137 respondents (35.1%) indicated that they always use the techniques. Some reasons why HCNs did not always use proper techniques were: working space, working height, bed width, and time factors. One typical comment was "due to the home environment that we encounter, it is not always possible to use proper body mechanics, i.e. low double sized bed; bed on blocks; old furniture low to floor with no springs left in cushion; scatter rugs; narrow hallways & doors dip; small, poorly maintained homes." These observations may explain why HCNs who had LBIs perceived poor/inadequate knowledge of lifting/transferring techniques as a high risk factor for their LBIs. This might be changed if the organizations provide related ongoing education programs for the HCNs.

Shopping. Activities outside work could be a risk factor for work-related LBIs. The occurrence of LBIs was associated with shopping ($\chi^2 = 5.446$, $p = 0.02$). Shopping involves driving, walking, and lifting/transferring of material. Those shopping activities have been identified as risk factors for LBIs. The majority of respondents (99.5%) were also female. Home care nurses are therefore exposed to the risk factors for LBIs not only at work but also after work. Kumar (1990) emphasized that repeated load application might result in cumulative fatigue to the lower back which was a risk factor for LBIs.

Client Factors

Twelve items were reviewed for client factors related to LBIs in home care. Not surprisingly, all client factors except clothing, were considered as medium or high risk factors. Also, there was a trend for HCNs who experienced LBIs to be somewhat more likely to perceive clients' weight, height, fatigue level, and cooperation as high risk factors. These findings were also reported in Owen's (1987) study. Lifting and transferring clients were identified as the most frequent precipitating factors of LBIs (Alberta Labour, 1993; Charney et al., 1993; Garg & Moore, 1992a; Garg & Owen, 1992; Garret et al., 1992; Harvey & Lyons, 1993) in the institutional working environment. Although respondents stated that HCNs did not provide direct client care as much as their counterparts in hospitals, they also identified lifting and transferring of clients as risk factors for LBIs. This could be due to the fact that HCNs work alone and have a lack of human/material resources in clients' homes. In institutional settings, extra staff and mechanical lifts are used with uncooperative clients; however, in home care, "one" nurse is the only resource.

Reporting Practices for LBIs

This survey supported other studies that indicated under-reporting of LBIs as a significant problem (Agnew, 1987; Levy & Wegman, 1995). Twenty-five respondents (46.3%) indicated that they reported their LBIs to home care agencies; however 29 HCNs (53.7%) stated that they did not report their LBIs. The most common reason identified was that the injury was considered not serious/not important. It is critical to immediately report all LBIs so they can be assessed to determine risk, follow-up, and counseling required. This will be difficult to implement in home care because HCNs work far away from the agency.

The relationship between the reporting practice and risk factors/behaviors, as well as the relationship between the reporting practice and organizational resources were examined. Results showed that (1) HCNs who frequently used biomechanical techniques for preventing LBIs were more likely to report their LBIs; and (2) HCNs were more likely to report their LBIs if their agencies had a back injury reporting policy/procedure, back injury follow-up policy/procedure, or safety policy/procedure. No relationship was found between orientation and ongoing inservice education programs and reporting practices. This does not mean that education would not help to prevent LBIs. The survey results showed that use of biomechanical techniques had a great influence on reporting LBIs. This indicates that teaching how to use biomechanical techniques can enhance LBI reporting practices. In addition, findings of this study support that education alone is not effective in reducing LBIs. Agencies' written policies and procedures play a crucial role in reporting LBIs. These findings indicate that there is a need for more information on how to reduce the organizational risk factors of LBIs.

Interesting results found were that: (1) HCNs who perceived poor lighting as a high risk factor for LBIs were likely to report their LBIs; and (2) HCNs who perceived clients' poor body awareness as a high risk factor for LBIs were likely not to report their LBIs. Perhaps HCNs considered lighting as a controllable factor while clients' body awareness was considered an uncontrollable element. If the environment was not bright enough, HCNs could turn on another light or ask residents/families to change light bulbs. Home care nurses even could carry their own flash lights if necessary. Hence, the problem of lighting could be solved. On the other hand, HCNs might consider clients' poor body awareness as an unchangeable factor which resulted from illness, such as a stroke. Even though HCNs reported LBIs resulting from clients' poor body awareness, agencies could not change the situation. Since nothing can be done, HCNs chose not to report these LBIs.

Organizational Resources

Overall, Alberta Home Care Agencies did not provide adequate LBI prevention programs or resources to HCNs. More than 50% of HCNs reported that they did not have or were not sure whether they had occupational health and safety programs including back injury prevention. Majority of the respondents also indicated that they did not have LBI-related written policies and procedures. Only 60% of the respondents indicated that they had the following three policies and procedures: reporting of back injuries during the day, safety policies and procedures, and smoking. However, HCNs who experienced LBIs tended to report that their agencies did not have policies/procedures for smoking ($\chi^2 = 6.51$, $p = 0.039$) and for reporting back injuries which occurred during the day ($\chi^2 = 10.737$, $p = 0.005$). It was not surprising to find that only a few agencies had near-accidents/close calls policies and procedures. This indicates that the nature of near-accidents/close calls for LBIs was not considered a crucial factor in preventing LBIs.

The dominant programs for back injury prevention in nursing are education and training in proper lifting techniques, body mechanics, and back care (Feldstein et al., 1993; Greenwood, 1986; Jensen, 1990; Karas & Conrad, 1996; Lammon et al., 1995; Lowenthal, 1994; Roth et al., 1993). Findings of the study showed an inconsistent result. More than 50% of HCNs reported that they did not have orientation and ongoing inservice programs in the following components: lifting/transferring techniques, lifting/transferring devices, reporting procedures for LBIs, reporting of near-accidents/close calls, driving safety, and back care protection. The responses supported Smith and White (1993) study results. There were not enough programs or resources for home care employees. Skillen (1996) strongly emphasized that organizational factors were inseparable from the workplace hazards in the physical and psychosocial work environments. Results of this study support Skillen's statement. The occurrence of LBIs was associated with the lack of organizational orientation programs ($\chi^2 = 22.217$, $p = 0$) and ongoing inservice ($\chi^2 = 7.520$, $p = 0.023$) on reporting procedures for LBIs; orientation ($\chi^2 = 9.612$, $p = 0.008$) and ongoing inservice ($\chi^2 = 6.594$, $p = 0.037$) on medical, disability, dismemberment and life insurance; orientation on Worker Compensation Board procedure ($\chi^2 = 7.791$, $p = 0.02$); and orientation on occupational health and safety services ($\chi^2 = 6.807$, $p = 0.033$).

Nursing Implications

Occupational hazards for health care workers are well documented and include biological, chemical, ergonomic, physical, psychological, reproductive, and safety hazards (Brune & Edling, 1989; Charney & Schirmer, 1993; Emmett & Baetz, 1987; Lunn & Waldron, 1991; Skillen, 1992; Triolo, 1989a, 1989b). Among these are low-back injuries (LBIs), which arise from ergonomic hazards, hazards posed to all nursing personnel in institutional settings, such as hospitals and nursing homes (Greenwood, 1986; Jensen, 1987a; Khalil et al., 1987; Kumar, 1990a; Lagerlof & Broberg, 1989; Torma-Krajewski, 1987). This Alberta study confirms that LBIs are also an occupational hazard in home care.

In 1991, concerns were raised by Alberta community-based nurses regarding occupational health and safety issues (Alberta Health, 1991). Home care nurses generally were not satisfied in several areas of occupational health and safety. These included: travel on the job (e.g. isolated areas, and adverse weather), potential client violence, and workplace physical environment. Also, they were not satisfied with employers' efforts concerning a healthy working environment, provision of health and safety information/training, and control of health and safety hazards (Alberta Health, 1991). Four years later, this Alberta study confirms that HCNs face the same occupational hazards and their employers have not shown any responses to HCNs' concerns. The responses indicate that there are not many occupational health and safety programs, LBI written policies and procedures, orientations, and ongoing inservices available to HCNs in home care agencies. The Alberta Occupational Health and Safety Act (Province of Alberta, 1995), outlines that "every employer shall ensure, as far as it is reasonably practicable for him to do so, the health and safety of [his employees]" (p. 4). Furthermore, one Alberta occupational hazard study in public health nurses showed that organizational factors were inseparable from ergonomic hazards at work (Skillen, 1996). Skillen (1996) suggested proactive management which might be the ultimate solution. Therefore, the employer must proactively identify, evaluate and control the hazards at work. Low-back injuries have been identified as an ergonomic hazard. Relevant educational programs, policies, and procedures should be provided to ensure a safe work environment.

Do HCNs face the same risk factors for LBIs as nursing personnel in institutions? Home care nurses face some of the same risk factors as the nursing personnel in institutions, such as client lifting and transferring, clients' cooperation, and bent-over posture. However, some unique risk factors/behaviors for LBIs among HCNs have been identified in this study. These included: working height, bed width, working space, availability of equipment, working alone, driving, handling materials, poor road conditions, poor maintenance of clients' homes, pets, and untrained caregivers. Most of these risk factors were related to clients' home environment. Responses indicated that most HCNs were knowledgeable about the use of biomechanical techniques to prevent LBIs. Traditionally, in nursing practice, the dominant programs for back injury prevention have been education and training in proper lifting techniques, body mechanics, and back care (Greenwood, 1986; Jensen, 1990; Roth et al., 1993). The facts are that, in home care, clients' home environments, and clients themselves make it impossible for HCNs to perform the correct techniques. In order to prevent LBIs in home care setting, supports from administration as well as clients/families are equally important.

Home care nurses interact with clients and their families in clients' own homes. In other words, HCNs enter the client's territory to provide nursing care. Animals as well as human beings have a sense of territoriality which "is an innate drive to gain and defend property" (Zimbardo, 1985, p. 645). Hence, clients have total control of their physical environment. This working environment is different from the institutional setting. Institutional nurses have the control of the physical environment and patients have to follow the institutional policies and procedures during the time they stay in the facilities. Home care nurses not only have to assess clients' physical and psychological aspects, but also the capability and willingness of the family members (Ceslowitz & Loreti, 1991). Home care nurses also have to spend more time with their clients/families to provide individual care at the client's own pace. Hence, the power of control is a crucial factor to prevent LBIs in home care settings. Perhaps, researchers/educators should reconsider Harvey and Lyons (1993) perspective on systems theory. They point out that clients usually do not consider themselves as part of the health care system. Clients' home settings, furniture, and behaviors play a critical role in occupational LBIs among HCNs. Perhaps, simply increasing clients' awareness of their influence in the prevention of LBIs among HCNs could reduce this occupational hazard.

Near-accidents/close calls have not been used to determine a cause and effect relationship and hence confirm the possible hazard existence. This study provides preliminary information on the variable of near-accidents/close calls. The findings indicate that the number of near-accidents/close calls is far more than the actual, and reported LBIs. Future research could investigate the near-accidents/close calls for LBIs, which might provide a root cause for LBIs.

Limitations of the Study

The study had limitations due to the sample size. Out of a total of 1114 nurses who were mailed the questionnaire, 400 responded to give a response rate of 35.9%. It is possible that systematic differences may exist between responding nurses (35.9%) and non-responding nurses (64.13%) in terms of the variables under study. Questionnaires were only sent to the RNs who reported Home Care as their category of employment when they renewed registration for 1996 with the Alberta Association of Registered Nurses (AARN). The researcher omitted the possibility that some nurses might consider private home care agencies as private nursing agencies, which is one category of employment in the registration form. Hence, nurses who worked in private nursing agencies were not included in this study. Results from the various health care regions should be interpretated with caution as general indicators only of nursing practice within associated places of employment, due to the small numbers per region. Nurses were asked to recall the number of LBIs, near-accidents/close calls, and the nature of near-accidents/close calls occurring to them throughout the previous 12 months. Accuracy of recall, therefore, may have affected some respondents' memory of those events.

Conclusion

This is the first LBI study of Alberta HCNs to investigate the variables of: the incidence, risk factors/behaviors, reporting practices, nature of near-accidents/close calls, and organizational resources. The descriptive information obtained indicates a need for further research in the area of home care and LBIs. The incidence of LBIs among Alberta HCNs is 19.8% and the incidence of near-accidents/close calls for LBIs is 150.5%.

Study results show that HCNs face the same LBI risk factors as their counterparts in institutions. Moreover, some unique environmental risk factors/behaviors for LBIs among HCNs have been identified. Environmental factors inside clients' homes and/or nurses' offices were working height, bed width, working space, work station, availability of equipment, equipment wrong size/awkward to operate, working alone, handling materials, poor maintenance of clients' homes, pets, and untrained caregivers. Moreover, the environmental factors outside clients' homes and/or nurses' offices were driving, and poor road conditions. In terms of workplace factors, there is a lack of organizational resources for LBI prevention in home care agencies. Organizational factors were found to play a crucial role in the occurrence of LBIs and reporting LBIs among HCNs. Home care nurses themselves are very well informed and very knowledgeable about how to prevent LBIs. Ergonomic job designs (Appendix B) may be a solution to reduce LBIs in the home care setting. Analysis of the results indicates that future research should focus on (1) increasing administrators'/managers' awareness of how to reduce LBIs; (2) involving clients as part of the health care operations system; and (3) investigating near-accidents/close calls for LBIs.

References

Agnew, J. E. (1987). Back pain in hospital workers. In E. A. Emmett (Ed.), State of the Art Reviews: Occupational Medicine (Vol. 2, No. 3, pp. 609-616). Philadelphia: Hanley & Belfus.

Alberta Health. (1991). Perceptions of nursing worklife: A community-based study - Analysis and results. Edmonton: Author.

Alberta Labour. (1994a). Back injuries: Alberta 1988-1992. Edmonton: Information Services.

Alberta Labour (1993). Back injury prevention: An ergonomic approach. Edmonton: Occupational Health and Safety Divison.

Alberta Labour. (1994b). Lost-time claims and claim rates: An annual statistical summary of occupational injury and illness in Alberta. Edmonton: Information Services.

Alberta Labour. (1993). Occupational health and safety review. Edmonton: Occupational Health and Safety Department.

Alleyne, B. C., Dufresne, R. M., Kanji, N., & Reesal, M. R. (1989). Costs of workers' compensation claims for hearing loss. Journal of Occupational Medicine, 31(2), 134-138.

AMA Council on Scientific Affairs. (1990). Council report: Home care in the 1990s. JAMA, 263(9), 1241-1244.

Andersson, G. B. J., Fine, L. J., & Silverstein, B. A. (1995). Musculoskeletal disorders. In B. S. Levy and D. H. Wegman (Eds.), Occupational health: Recognizing and preventing work-related disease (3rd. ed., pp. 455-487). Boston: Little, Brown.

Bailey, M. (1990). Occupational HIV infection risk. Lancet, 335(8697), 1104-1105.

Bandura, A. (1986). Social foundations of thought and action: A social cognitive theory. Englewood Cliffs, NJ: Prentice-Hall.

Beck-Friis, B., Strang, P., & Sjoden, P. (1991). Work stress and job satisfaction in hospital-based home care. Journal of Palliative Care, 7(3), 15-21.

Bell, F. (1987). Ergonomic aspects of equipment. International Journal Nursing Studies, 24(4), 331-337.

Bigos, S. J., Battie, M. C., Spengles, D. M., Fisher, L. D., Fordyce, W. E., Hasson, T. H., Nachemson, A. L., & Wortley, M. D. (1991). A prospective study of work perceptions and psychosocial factors affecting report of back injury. Spine, 16(1), 1-6.

Bird, F. E., & Germain, G. L. (1986). Practical loss control leadership. Loganville, GA: Institute Publishing.

Bittel, E. M. (1986). Safety tips for the community health nurse in urban practice. Home Healthcare Nurse, 4(1), 30-31.

Brink, P. J., & Wood, M. J. (1994). Basic steps in planning nursing research: From question to proposal (4th ed.). Boston: Jones and Bartlett.

Brofenbrenner, U. (1977). Toward an experimental ecology of human development. American Psychologist, 32, 513-531.

Brofenbrenner, U. (1979). The ecologyof human development. Cambridge, MA: Harvard University Press.

Brown, J. R. (1972). Manual lifting and related fields: An annotated bibliography. Toronto: Labor Safety Council of Ontario.

Brune, D. K., & Edling, C. (Eds.). (1989). Occupational hazards in the health professions. Boca Raton, FL: CRC Press.

Buckle, P. (1982). A multidisciplinary investigation of factors associated with low back pain. Unpublished doctoral dissertation, Cranfield Institute of Technology, Cranfield, UK.

Bullock, M. I. (1990). Introduction. Ergonomics - a broad challenge for the physiotherapist. In M. I. Bullock (Ed.), Ergonomics: The physiotherapist in the workplace (pp. 3-12). New York: Churchill Livingstone.

Carver, C.S., & Humphries, C. (1982). Social psychology of the Type-A coronary prone behavior pattern. In G. S. Sanders and J. Suls (Eds.), Social psychology of health and illness. Hillsdale, NJ: Lawrence Erlbaum.

Ceslowitz, S. B., & Loreti, S. T. (1991). Easing the transition from hospital nursing to home care: A research study. Home Healthcare Nurse, 9(4), 32-35.

Charney, W., & Schirmer, J. (Eds.). (1993). Essentials of modern hospital safety. Boca Raton, FL: Lewis.

Charney, W., Zimmerman, K., & Walara, E. (1993). A design method to reduce lost time back injury in nursing. In W. Charney and & J. Schirmer (Eds.), Essentials of modern hospital safety. Boca Raton, FL: Lewis.

Cohen-Mansfield, J., Culpepper, W. J., & Carter, P. (1996). Nursing staff back injuries: Prevalence and costs in long term care facilities. AAOHN Journal, 44(1), 9-17.

Conrad, K. M., Balch, G. I., Reichelt, P. A., Muran, S, & Oh, K. (1994). Musculoskeletal injuries in the fire service: Views from a focus group study. AAOHN Journal, 42(12), 572-581.

Crocker, E. M. (1987). Controlling smoking in the workplace. Labor Law Journal, 38(12), 739-746.

Curreri, C. A., Gilley, W. F., Faulk, L., & Swansburg, R. C. (1985). Job satisfaction: Hospital-based RNs versus home health care RNs. Nursing Forum, 4(22), 125-134.

Daft, R. L. (1992). Organization theory and design (3rd ed.). St. Paul, MN: West Publishing.

Day, S. B., & Lambo, T. A. (1990). Introduction: International health and health for all. In T. A. Lambo & S. B. Day (Eds.), Issues in contemporary international health (pp. 1-10). New York: Plenum Medical.

Dehlin, O., Henderud, B., & Horal, J. (1976). Back symptoms in nursing aids in a geriatric hospital. Scandinavian Journal of Rehabilitation Medicine, 8, 47-53.

Eastman-Kodak. (1983). Ergonomic design for people at work (Vol. 1). Belmont, CA: Lifetime Learning Publications.

Emmett, E. A., & Baetz, J. (1987). Health in the health care industry? In E. A. Emmett (Ed.), Occupational Medicine: State of the Art Reviews (Vol. 2, No. 3, pp. ix-xv). Philadelphia: Hanley & Belfus.

Endler, N. S., & Magnusson, D. (1976). Personality and person by situation interactions. In N. S. Endler and D. Magnusson (Eds.), Interactional psychology and personality (pp. 1-26). New York: John Wiley and Sons.

Erdil, M., Dickerson, O. B., & Chaffin, D. B. (1994). Biomechanics of manual materials handling and low-back pain. In C. Zenz, O. B. Dickerson, and E. P. Horvath (Eds), Occupational Medicine (3rd ed.) (pp. 239-257). St.Louis, MO: Mosby-Year Book.

Falkel, J. E., Sawka, M. N., Levine, L., Pimental, N. A., & Pandolf, K. B. (1986). Upper-body exercise performance: Comparison between women and men. Ergonomics, 29, 145-154.

Feldstein, A., Valanis, B., Vollmer, W., Stevens, N., & Overton, C. (1993). The back injury prevention project pilot study: Assessing the effectiveness of back attack, and injury prevention program among nurses, aides, and orderlies. Journal of Occupational Medicine, 35(2), 114-120.

Frymoyer, J. W. & Pope, M. H. (1987). Epidemiologic insights into the relationship between usage and back disorders. In N. M. Hadler (Ed.), Clinical concepts in regional musculoskeletal illness (pp. 263-279). Orlando, FL: Grune & Stratton.

Gagnon, M., Sicard, C., & Sirois, J. P. (1986). Evaluation of forces on the lumbo-sacral joint and assessment of work and energy transfers in nursing aides lifting patients. Ergonomics, 29, 407-421.

Garg, A. & Moore, J. S. (1992a). Epidemiology of low-back pain in industry. In J. S. Moore & A. Garg (Eds.), Occupational Medicine: State of the Art Reviews (Vol. 7, No. 4, pp. 593-603). Philadelphia: Hanley & Belfus.

Garg, A., & Moore, J. S. (1992b). Prevention strategies and the low back in industry. In J. S. Moore & A. Garg (Eds.), Occupational Medicine: State of the Art Reviews (Vol. 7, No. 4, pp. 629-640). Philadelphia: Hanley & Belfus.

Garg, A., & Owen, B. D. (1992). Reducing back stress to nursing personnel: An ergonomic intervention in a nursing home. Ergonomics, 35(11), 1353-1375.

Garg, A., Owen, B. D., Beller, D., & Banaag, J. (1991a). A biomechanical and ergonomic evaluation of patient transferring tasks: Bed to wheelchair and wheelchair to bed. Ergonomics, 34, 289-312.

Garg, A., Owen, B. D., Beller, D., & Banaag, J. (1991b). A biomechanical and ergonomic evaluation of patient transferring tasks: Wheelchair to shower chair and shower chair to wheelchair. Ergonomics, 34, 407-419.

Garg, A., Owen, B. D., & Carlson, B. (1992). An ergonomic evaluation of nursing assistants' job in a nursing home. Ergonomics, 35(9), 979-995.

Garrett, B., Singiser, D., & Banks, S. (1992). Back injuries among nursing personnel: The relationship of personal characteristics, risk factors, and nursing practices. AAOHN Journal, 40(11), 510-516.

Green, L. W. (1984). Modifying and developing health behavior. In L. Breslow, J. Fielding, and L. Lave (Eds.), Annual Review of Public Health (Vol. 5, pp. 215-236). Palo Alto, CA: Annual Reviews.

Greenwood, J. G. (1986). Back injuries can be reduced with worker training, reinforcement. Occupational Health and Safety, 55, 26-29.

Harber, P., Bellet, E., Gutowski, M., Soohoo, K., Lew, M., & Roman, A. (1985). Occupational low-back pain in hospital nurses. Journal of Occupational Medicine, 27, 518-524.

Harber, P., Bellet, E., Vojtecky, M., Rosenthal, E., Shimozaki, S., & Horan, M. (1988). Nurses' belief about cause and prevention of occupational back pain. Journal of Occupational Medicine, 30, 797-800.

Haggar-Guenette, C., & Proulx, J. (1992). Back injuries at work, 1982-1990. Perspectives on Labour and Income, 4(3), 31-37.

Hanrahan, A. C. (1996). Sharps injuries in Alberta home care nurses. Unpublished master's thesis, University of Alberta, Edmonton.

Harrigton, J. M., & Gill, F. S. (1987). Occupational Health. London: Blackwell Scientific Publications.

Harvey, M., & Lyons, D. (1993). Occupational injuries to graduate nurses. Paper presented at the seventh annual Margaret Scott Wright lectureship and research conference, Edmonton.

Hempel, S. (1993). Home truths. Nursing Times, 89(15), 40-41.

Hood, J. N., & Smith, H. L. (1994). Quality of work life in home care: The contribution of leaders' personal concern for staff. Journal of Nursing Administration, 24(1), 40-47.

Hoffman, B. H., & Gray, D. C. (1994). The establishment of an occupational health program. In R. J. McCunney (Ed.), A practical approach to occupational and environmental medicine (2nd ed.). Boston: Little, Brown.

Holt, R. R. (1982). Occupational stress. In L. Goldberger and S. Breznitz (Eds.), Handbook of stress: Theoretical and clinical aspects. New York: Free Press.

Humphrey, C. J. (1988). The home as a setting for care: Clarifying boundaries. Nursing Clinics of North America, 23(2), 305-315.

Jacknow, D., McCunney. R. J., & Jofe, M. (1988). Musculoskeletal disorders. In Robert J. McCunney (Ed.), Handbook of occupational medicine (pp. 106-129). Toronto: Little, Brown.

Janis, I. I. (1984). The patient as decision maker. In W. D. Gentry (Ed.), Handbook of behavioral medicine. New York: Guilford Press.

Jensen, R. C. (1987a). Disabling back injuries among nursing personnel: Research needs and justifications. Research in Nursing and Health, 10, 29-38.

Jensen, R. C. (1987b). Epidemiologic studies of the back pain problems of nursing personnel - the need for consistency in future studies. In S. S. Asfour (Ed.), Trends in ergonomic/human factors IV (pp. 803-809). London: Taylor & Francis.

Jensen, R. C. (1990). Prevention of back injuries among nursing staff. In W. Charney & J. Schirmer (Eds.), Essentials of modern hospital safety. Oxford: Oxford University.

Juhl, N., Dunkin, J. W., Stratton, T., Geller, J., & Ludtke, R. (1993). Job satisfaction of rural public and home health nurses. Public Health Nursing, 10(1), 42-47.

Karas, B. E., & Conrad, K. M. (1996). Back injury prevention interventions in the workplace: An integrative review. AAOHN Journal, 44(4), 189-196.

Khalil, T. M., Asfour, S. S., Marchette, B., & Omachonu, V. (1987). Lower back injuries in nursing: A biomechanical analysis and intervention strategy. In S. S. Asfour (Ed.), Trends in ergonomic/human factors IV (pp. 811-821). London: Taylor & Francis.

Kobasa, S. C. (1982). The hardy personality: Toward a social psychology of stress and health. In G. S. Sanders and J. Suls (Eds.), Social psychology of health and illness. Hillsdale, NJ: Lawrence Erlbaum.

Krahn, H. (1990). Quantifying semi-structured interviews. Edmonton: Department of Sociology, University of Alberta.

Kumar, S. (1994). A conceptual model of overexertion, safety, and risk of injury in occupational settings. Human Factors, 36(2), 197-209.

Kumar, S. (1990a). Cumulative load as a risk factor for back pain. Spine, 15(12), 1311-1316.

Kumar, S. (1990b). Lifting and ergonomics. In M. I. Bullock (Ed.), Ergonomics: The physiotherapist in the workplace (pp. 183-211). New York: Churchill Livingstone.

Kumar, S. (1989). Load history and backache among institutional aides. In A. Mital (Ed.), Advanced industrial ergonomics and safety I (pp. 757-765). London: Taylor & Francis.

Kumar, S., & Garand, D. (1992). Static and dynamic lifting strength at different reach distances in symmetrical and asymmetrical planes. Ergonomics, 35(7/8), 861-880.

Kumar, S., & Mital, A. (1992). Margin of safety for the human back: A probable consensus based on published studies. Ergonomics, 35(7/8), 769-781.

Lagerlof, E., & Broberg, E. (1989). Occupational injuries and diseases. In D. K. Brune & C. Edling (Eds.), Occupational hazards in the health professions. Boca Raton, FL: CRC Press.

Lammon, C. B., Foote, A. W., Leli, P. G., Ingle, J., & Adams, M. H. (1995). Clinical nursing skills. Philadephia: WB Saunders Company.

Lees, R. E. M., & Laundry, B. R. (1989). Increasing the understanding of industrial accidents: An analysis of potential major injury records. Canadian Journal of Public Health, 80(6), 423-426.

Levy, B. S., & Wegman, D. H. (1995). Occupational health in the global context: An American perspective. In B. S. Levy & D. H. Wegman (Eds.), Occupational health: Recognizing and preventing work-related disease (3rd ed.) (pp. 3-24). Boston: Little, Brown.

Lloyd, P., Tarling, C., Troup, J. D. G., & Wright, B. (1987). The handling of patients: A guide for nurses (2nd ed.). London: The Royal College of Nursing.

Lowenthal, G. (1994). Occupational health programs in clinics and hospitals. In C. Zenz, O. B. Dickerson, and E. P. Horuath (Eds.), Occupational medicine (3rd ed.) (pp. 875-882). St. Louis: Mosby-Year Book Inc.

Lunn, J. A., & Waldron, H.A. (1991). Concerning the carers: Occupational health for health care workers. London: Butterworth Heinemann.

Lynn, M. R. (1986). Determination and quantification of content validity. Nursing Research, 35(6), 382-385.

Mackay, C. J., & Bishop, C. M. (1984). Occupational health of women at work: Some human-factors considerations. Ergonomics, 27, 489-498.

Marvan-Hyam, J. (1986). Occupational stress of the home health nurse. Home Healthcare Nurse, 4(3), 18-21.

Massi-O'Malley, P. A. (1993). A nurse executive perspective. Journal of Nursing Administration, 23(12), 13.

McAbee, R. R. (1988). Nurses and back injuries: A literature review. AAOHN Journal, 36, 200-209.

McClave, J. T., & Dietrich II, F. H. (1989). A first course in statistics. San Francisco: Dellen.

McLeroy, K. R., Bibeau, D., Steckler, A., & Glanz, K. (1988). An ecological perspective on health promotion programs. Health Education Quarterly, 15, 351-377.

McLeroy, K. R., Gottlieb, N. H., & Burdine, J. N. (1987). The business of health campaigns. Health Education Quarterly, 14(1), 91-110.

Morgan, K. J. (1991). Motor vehicle-related fatalities: Implications for home healthcare. Home Healthcare Nurse, 9(3), 18-22.

Myers, A., Jensen, R. C., Nestor, D., & Rattiner, J. (1993). Low back injuries among home health aides compared with hospital nursing aides. Home Health Care Services Quarterly, 14(2/3), 149-155.

Nadwairski, J. A. (1992). Inner-city safety for home care providers. Journal of Nursing Administration, 22(9), 42-47.

Nearing, M. (1994). Editorial: Support from the top. OH&S Canada, 10(6), 4.

Newman, B. (1995). The Neuman systems model (3rd ed.). Norwalk, CT: Appleton & Lange.

Oberg, L., & Wagner, N. (1994). Core Health Services in Alberta. Calgary: Health Plan Coordination Project.

Owen, B. D. (1987). The need for application of ergonomic principles in nursing. In S. Asfour (Ed.), Trends in ergonomic/human factors IV (pp. 831-838). London: Taylor & Francis.

Owen, B. D., & Garg, A. (1989). Patient handling tasks perceived to be most stressful by nursing assistants. In A. Mital (Ed.), Advances in industrial ergonomics and safety I (pp. 775-781). London: Taylor & Francis.

Owen, B. D., & Garg, A. (1991). Reducing risk for back pain in nursing personnel. AAOHN Journal, 39(1), 24-33.

Pender, N. J. (1987). Health promotion in nursing. Norwalk, CT: Appleton & Lange.

Personick, M. E. (1990). Nursing home aides experience increase in serious injuries. Monthly Labour Review, 113(2), 30-37.

Pervin, L. A. (1968). Performance and satisfaction as a function of individual-environment fit. Psychological Bulletin, 69, 56-68.

Pheasant, S. (1987). Some anthropometric aspects of workstation design. International Journal Nursing Studies, 24(4), 291-298.

Pope, M. H., Andersson, G. B. J., Frymoyer, J. W., & Chaffin, D. B. (1991). Occupational low back pain: Assessment, treatment, and prevention. St. Louis: Mosby-Year Book.

Prezant, B., Demers, P., & Strand, K. (1987). Back problems, training experience, and use of lifting aids among hospital nurses. In S. S. Asfour (Ed.), Trends in ergonomic/human factors IV (pp. 839-846). London: Taylor & Francis.

Province of Alberta. (1995). Occupational health and safety act. Edmonton: Queen's Printer.

Reason, J. (1991). Too little and too late: A commentary on accident and incident reporting systems. In T. W. van der Schaaf, D. A. Lucas, & A. R. Hale (Eds.), Near miss reporting as a safety tool (pp. 9-26). Toronto: Butterworth-Heinemann Ltd.

Rodgers, S. H. (1992). A functional job analysis technique. In J. S. Moore and A. Garg (Eds.), Occupational Medicine, 7(4), 679-671153.

Roth, P. T., Ciecka, J., Wood, E. C., & Taylor, R. (1993). Evaluation of a unique mechanical client lift: Efficiency and perspectives of nursing staff. AAOHN Journal, 41(5), 229-234.

Rozelle, G. J. (1992). Is home care a dangerous occupation? Caring, 11(4), 50-53.

Santrock, J. W. (1992). Life-span development (4th ed.). Dubuque, IA: Wm. C. Brown Publishers.

Schroeder, L. R., & Gaddy, C. D. (1987). How to apply ergonomic principles to minimize human error and maximize human efficiency. In L. Stote (Ed.), Handbook of occupational safety and health (pp. 37-63). New York: John Wiley & Sons.

Shuster, G. F. (1992). Job satisfaction among home healthcare nurses: What they report and what it means. Home Healthcare Nurse, 10(4), 33-38.

Skarplik, C. (1988). Patient handling in the community. Nursing (London), 3(30), 13-16.

Skillen, D. L. (1992). An organizational analysis of work hazards in community health. Unpublished doctoral dissertation, University of Alberta, Edmonton.

Skillen, D. L. (1996). Toward a social structural understanding of occupational hazards in public health. International Journal of Health Services, 26(1), 111-145.

Skovron, M. L., Nordin, M., Sterling, R. C., & Mulvihill, M. N. (1987). Patient care and low back injury in nursing personnel. In S. S. Asfour (Ed.), Trends in ergonomic/human factors IV (pp. 855-862). London: Taylor & Francis.

Sloan, R. P. (1987). Workplace health promotion: A commentary on the evolution of a paradigm. Health Education Quarterly, 14(2), 181-194.

Sluchak, T. J. (1992). Ergonomics: Origins, focus, and implementation considerations. AAOHN Journal, 40(3), 105-112.

Smith, W. A., & White, M. C. (1993). Home health care: Occupational health issue. AAOHN Journal, 41(4), 180-185.

Snook, S. H., Campanelli, R. A., & Hart, J. W. (1978). A study of three preventive approaches to low-back injury. Journal of Occupational Medicine, 20, 478-481.

Statistics Canada. (1993). Work injuries: 1991-1993. Ottawa: Labour and Household Surveys Analysis Division.

Stephany, T. M. (1993). Health hazards concerns of home care nurses: A staff nurse perspective. Journal of Nursing Administration, 23(12), 12-13.

Stretcher, V. J., Devellis, B. M., Becker, M. H., & Rosenstock, I. M. (1986). The role of self-efficacy in achieving health behavior change. Health Education Quarterly, 13(1), 73-92.

Stubbs. D. A. (1987). Introduction: Ergonomics in nursing. International Journal of Nursing Studies, 24(4), 285-389.

Stubbs, D. (1991). Ergonomics and back pain. Occupational Health, 43 (3), 82-85.

Stubbs, D. A., Buckle, P. W., Hudson, M. P., Rivers, P. M., & Worringham, C. J. (1983). Back pain in the nursing profession I. Epidemiology and pilot methodology. Ergonomics, 26, 755-765.

Stubbs, D. A., Buckle, P. W., Hudson, M. P., & Rivers, P. M. (1983). Backpain in the nursing profession II. The effectiveness of training. Ergonomics, 18, 767-779.

Tesh, S. (1981). Disease causality and politics. Journal of Health Politics, Policy and Law, 6(3), 369-390.

Thompson, D. A. (1990). Ergonomics & the prevention of occupational injuries. In J. LaDoa (Ed.), Occupational medicine (pp. 38-57). Norwalk, CT: Appleton & Lange.

Torma-Krajewski, J. (1987). Analysis of injury data and job tasks at a medical center. In S. S. Asfour (Ed.), Trends in ergonomic/human factors IV (pp. 863-874). London: Taylor & Francis.

Travers, P. H. (1992). Implementing ergonomic strategies in the workplace: An occupational health nursing perspective. AAOHN Journal, 40(3), 129-137.

Triolo, P. K. (1989a). Occupational health hazards of hospital staff nurses, Part I: Overview and psychosocial stressors. AAOHN Journal, 37(6), 232-237.

Triolo, P. K. (1989b). Occupational health hazards of hospital staff nurses, Part II: Overview and psychosocial stressors. AAOHN Journal, 37(7), 274-279.Troup, J. D. G. (1984). Causes, prediction and prevention of back pain at work. Sand Journal Work Environment, 10, 419.

Troup, J. D. G. (1989). Ergonomics for health professionals in hospitals and the community. In D. K. Brune & C. Edling (Eds.), Occupational hazards in the health professions (pp. 251-270). Boca Raton, FL: CRC Press.

Troup, J. D. G., Foreman, T. K., Baxter, C. E., & Brown, D. (1987). Tests of manual working capacity and the prediction of low back pain. In P. Buckle (Ed), Musculoskeletal disorders at work (pp. 165-171). London: Taylor & Francis.

Troup, J. D. G., & Rauhala, H. H. (1987). Ergonomics and training. International Journal of Nursing Studies, 24(4), 325-330.

Tsai, S. P., Gilstrap, E. L., Cowles, S. R., Waddell, L. C., & Ross, C. E. (1992). Personal and job characteristics of musculoskeletal injuries in an industrial population. Journal of Occupational Medicine, 34(6), 606-612.

U.S. Department of Health and Human Services. (1981). Work practices guide for manual lifting. (OHHS [NIOSH] Publication No. 81-122), Cincinnati, OH: National National Institute for Occupational Safety and Health.

van der Schaaf, T. W. (1991). Introduction. In T. W. van der Schaaf, D. A. Lucas, & A. R. Hale (Eds.), Near miss reporting as a safety tool (pp. 1-8). Toronto: Butterworth-Heinemann Ltd.

Van Maanen, J., & Barley, S. R. (1985). Organizational culture: Fragments of a theory. In P. J. Frost, L. F. Moore, M. R. Louis, C. C. Lundberg, and J. Martin (Eds.), Organizational culture. Beverly Hills, CA: Sage.

Venning, P. J. (1988). Back injury prevention among nursing personnel: The role of education. AAOHN Journal, 36, 327-333.

Venning, P. J., Walter, S. D., & Stitt, L. W. (1987). Personal and job-related factors as determinants of incidence of back injuries among nursing personnel. Journal of Occupational Medicine, 29, 820-825.

Walsh, K., Varnes, N., Osmond, C., Styles, R., & Coggon, D. (1989). Occupational causes of low-back pain. Scandinavian Journal of Work, Environment, and Health, 15, 54-59.

Weeks, J. L., Levy, B. S., & Wagner, G. R. (Eds.). (1991). Preventing occupational disease and injury. Washington, DC: American Public Health Association.

Wilmore, J. H., & Costill, D. J. (1988). Training for sport and activity: The physiological basis of the conditioning process (3rd ed.). Dubuque, IA: William C. Brown.

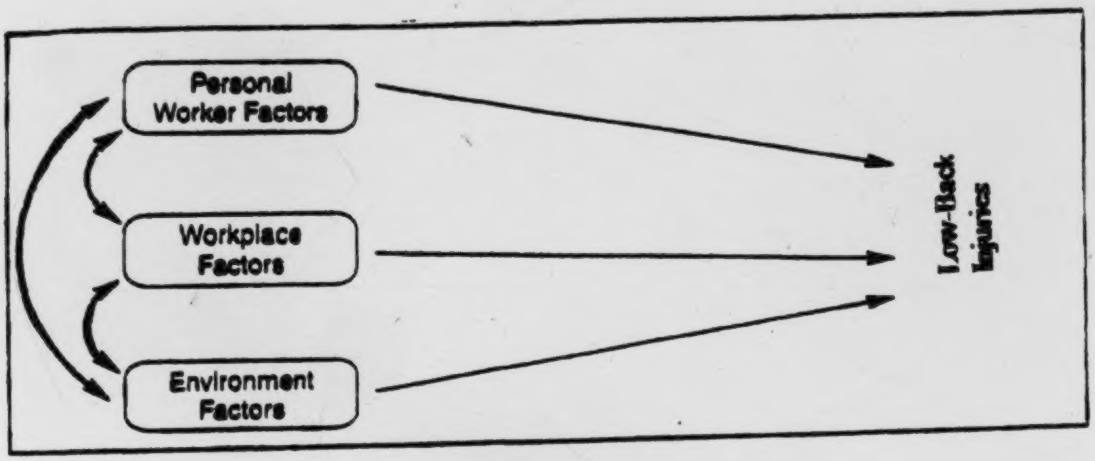
Wood, D. J. (1987). Design and evaluation of a back injury prevention program within a geriatric hospital. Spine, 12, 77-82.

Wright, D. (1993). The princess and the chemo spills - a policy magically turned into a fairy tale. The Journal of Continuing Education in Nursing, 24(1), 37-38.

Zimbardo, P. G. (1985). Psychology and life (12th ed.). Boston: Scott, Foresman.

Appendix A

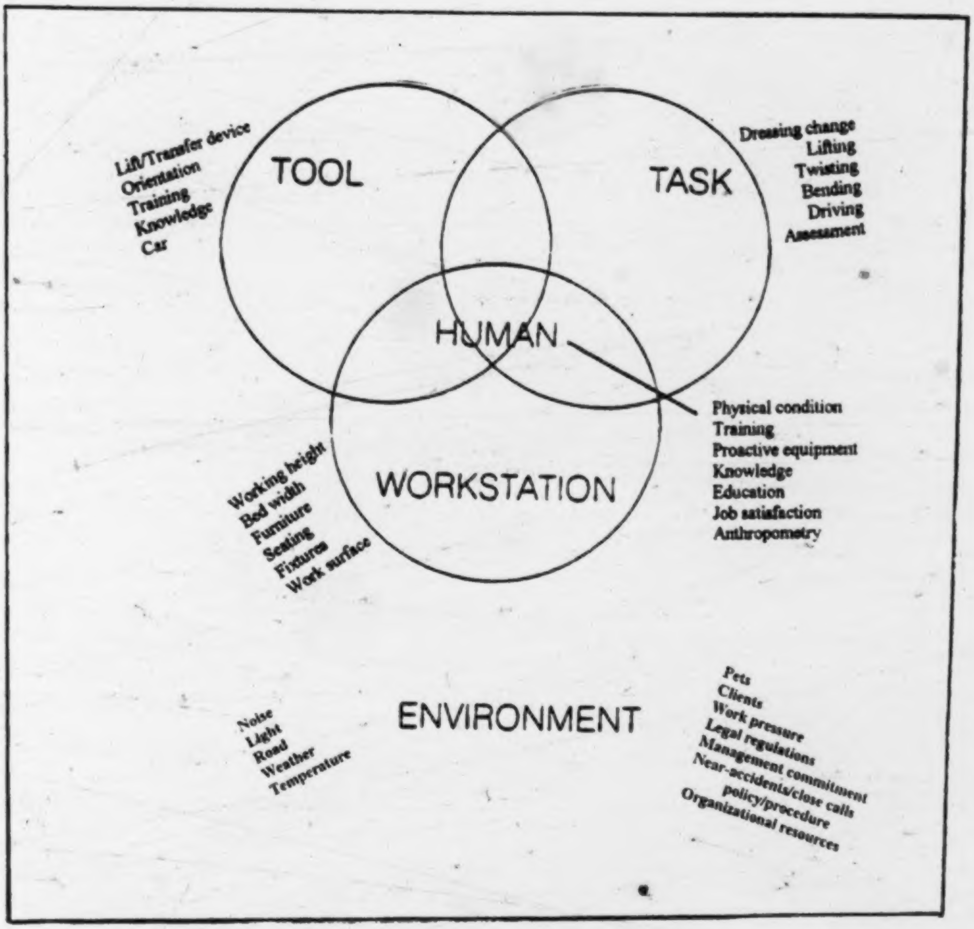
Ecology Model


Personal Worker Factors
Workplace Factors
Environment Factors
Low-Back Injuries

Conceptual Framework of the Study: An Ecological Model

Appendix B

Ergonomic Job Components


Lift/Transfer device
Orientation
Training
Knowledge
Car
TOOL
TASK
Dressing change
Lifting
Twisting
Bending
Driving
Assessment
HUMAN
Physical condition
Training
Proactive equipment
Knowledge
Education
Job satisfaction
Anthropometry
Working height
Bed width
Furniture
Seating
Fixtures
Work surface
WORKSTATION
ENVIRONMENT
Noise
Light
Road
Weather
Temperature
Pets
Clients
Work pressure
Legal regulations
Management commitment
Near-accidents/close calls
policy/procedure
Organizational resources

Ergonomic Job considerations in Home Care

Appendix C

Back and Neck Injuries

Provincial Statistics

BACK AND NECK INJURIES
PROVINCIAL STATS (1990 - 1994)

Newly Reported Back & Neck Claims

Year	Neck Claims	% of Total	Back Claims	% of Total	Neck & Back	% of Total	Other Claims	% of Total	Total Claims
1990	1,233	1.9	15,879	24.6	17,112	26.5	47,391	73.5	64,503
1991	1,190	2.2	14,436	26.2	15,626	28.3	39,536	71.7	55,162
1992	2,228	2.9	17,158	22.6	19,386	25.6	56,449	74.4	75,835
1993	2,852	3.1	18,352	19.9	21,204	23.0	70,821	77.0	92,025
1994	2,760	3.0	17,826	19.1	20,586	22.1	72,601	77.9	93,187

Costs Transacted for Back & Neck Claims

Year	Neck Costs	% of Total	Back Costs	% of Total	Neck & Back	% of Total	Other Claims	% of Total	Total Costs
1990	6,186,369	1.8	99,042,814	28.8	105,229,183	30.6	239,072,393	69.4	344,301,576
1991	7,900,872	1.9	119,049,585	29.3	126,950,457	31.3	278,938,794	68.7	405,889,251
1992	13,279,567	3.3	134,055,467	33.2	147,335,034	36.4	256,885,485	63.6	404,220,519
1993	14,052,253	3.9	115,620,360	31.9	129,672,613	35.8	232,456,063	64.2	362,128,676
1994	13,488,186	4.5	86,766,495	28.9	100,254,681	33.4	199,885,128	66.6	300,139,809

Compensation Days Transacted for Back & Neck Claims

Year	Neck Days	% of Total	Back Days	% of Total	Neck & Back	% of Total	Other Claims	% of Total	Total Days
1990	38,653	1.8	691,509	33.0	730,162	34.8	1,366,559	65.2	2,096,721
1991	43,072	1.9	725,186	32.4	768,258	34.3	1,469,723	65.7	2,237,981
1992	74,633	3.9	669,481	35.3	744,114	39.2	1,154,503	60.8	1,898,617
1993	68,385	4.0	564,785	32.7	633,170	36.6	1,096,239	63.4	1,729,409
1994	51,483	3.6	442,740	31.3	494,223	35.0	918,862	65.0	1,413,085

Note: Costs and compensation days are for all back and neck claims with transactions in the specified year regardless of its accident or entry year. Administration costs and self-insurers are included in these figures.

Prepared by Finance/Actuarial Services 5/11/95

Appendix D

Authorization Access

Executive Director of the Alberta Association of Registered Nurses

ALBERTA ASSOCIATION OF REGISTERED NURSES

11620 - 168 STREET
EDMONTON ALBERTA
T5M 4A6
TELEPHONE (403) 451-0043
TOLL FREE IN ALBERTA
1 800 252 9392
FAX (403) 452 3276

FILE NO. --

June 6, 1995

Kin Cheung
#5, 10825 - 86 Avenue
Edmonton, AB T6E 2N1

Dear Kin

Re: Access to AARN Membership Data

Based on the receipt of ethical approval from the University of Alberta Joint Ethics Review Committee, I would be pleased to grant your request for access to the AARN membership list for the purpose of mailing a research questionnaire to Alberta Home Care Nurses. Please forward evidence of ethical approval when it is received. The granting of this request is not to be interpreted as an endorsement of the project by the AARN.

As indicated in my earlier correspondence, membership lists per se are never provided, but rather the request is accommodated by the use of the Association's mailing service. You will be charged for the costs associated with this mailing.

This is a service provided on a cost-recovery basis to support nursing research and education. Generating the information or lists requested is scheduled as staff and computer times are available once AARN computer system requirements are met. Please refer to your copy of the "Policies and Procedures for Accessing the Membership System," which includes information related to cost.

We would like to receive a copy of the final questionnaire as the one forwarded to us is not complete. We would also appreciate receiving a copy of your study for the AARN Library when it is complete.

Please contact Janet O'Donnell, Computer Coordination and Network Administrator, of this office (telephone 451-0043, ext. 318), concerning your specific needs, particularly related to the timing of your mailout, and she will attempt to facilitate your request. It is helpful if you provide her with advance notice of your deadlines.

Sincerely,

Liz Turnbull

Liz Turnbull, RN, MN
Executive Director

Encl

cc Joan Welch
   Janet O'Donnell

Appendix E

Letter of Introduction

University of Alberta
Edmonton

Faculty of Nursing

Canada T6G 2G3

3rd Floor Clinical Sciences Building

Date: November 17, 1995

Dear Home Care Nurse:

My name is Kin Cheung. I am a graduate student in the Faculty of Nursing, University of Alberta. I am doing a study about low-back injuries in Alberta home care nurses. The purpose of this study is to describe the incidence and risk factors/behaviors for low-back injuries among Alberta home care nurses. The significance of this study is to increase the awareness of low-back injuries among home care nurses; hence a comprehensive back protection program could be developed based on your need.

Your participation in this study would involve completing the enclosed questionnaire. It will take about ***25*** minutes for you to complete. All replies will be anonymous and treated confidentially.

The AARN has been paid to mail out the questionnaire, but the AARN has not necessarily endorsed the study. Your name has been computer selected and is unknown to the researcher. There is only a code number on the return envelope for questionnaire handling.

Please return the questionnaire in the self-addressed, stamped envelope provided. Do not put your name on the questionnaire or the return envelope. Participation in this study is voluntary and your consent will be implied with the return of the completed questionnaire. The responses will be safely stored in a locked filing cabinet for at least 7 years. The information may be considered later for secondary analysis after permission has been received from an appropriate ethical review committee.

If you agree to participate, please complete and return the questionnaire in the self-addressed envelope provided by ***December 8, 1995***. If you have any questions about this survey, please contact me or my supervisor at the telephone numbers given below. A copy of the completed study will be available at the AARN library or the Faculty of Nursing, University of Alberta.

Thank you for your assistance in completing this questionnaire.

Kin Cheung, MN Candidate
#5, 10825-86 Ave
Edmonton, AB
T6E 2N1
433-0192

Dr. Lynn Skillen, PhD, RN
Associate Professor
Faculty of Nursing
University of Alberta
Edmonton, AB
T6G 2G3
492-2648

Appendix F

Questionnaire

"Home Care Nurses' Low-Back Injury Questionnaire"

Home Care Nurses' Low-Back Injuries Questionnaire

Instructions for Completing the Questionnaire

Please read each question carefully. Circle the response which is most appropriate for you. Choose only ONE response unless otherwise specified.

In answering the questions, please use the following definition of "Low-Back Injury" as a reference:

> **Low-Back Injury is an occupational injury which is triggered by a specific event at work and occurs in the area between the lower posterior costal margins and gluteal folds.**

THIS QUESTIONNAIRE CONTAINS 8 PAGES
PRINTED
ON BOTH SIDES OF THE PAGES

Home Care Nurses' Low-Back Injury Questionnaire

SECTION I

1. *Do you consider the risk of low-back injury a problem in home care?*

Yes 1
No 2

2. *Indicate the relative seriousness of the following factors for low-back injuries in home care,* ***AS YOU SEE THEM****, by circling the appropriate number:*

(a) Environmental Factors (*Clients' homes and/or Nurses' office*)

	No Risk	**Low Risk**	**Medium Risk**	**High Risk**
Working Heights *(e.g. bed too high or too low)*	1	2	3	4
Bed Width *(e.g. too wide)*	1	2	3	4
Storage Arrangements *(e.g. items difficult to reach)*	1	2	3	4
Working Space *(e.g. insufficient, cramped)*	1	2	3	4
Floor surfaces *(e.g. carpet too loose)*	1	2	3	4
Work station in office *(e.g. not adjustable to your need)*	1	2	3	4
Obstacles *(e.g. boxes in the bedroom)*	1	2	3	4
Equipment wrong size and/or awkward to operate	1	2	3	4
Equipment hard to move through cramped spaces	1	2	3	4
Equipment not available when needed	1	2	3	4
Equipment not maintained and/ or not in working condition	1	2	3	4

Home Care Nurses' Low-Back Injury Questionnaire

Section I (Cont'd)

2. (a) Environmental Factors (*Clients' homes and/or Nurses' office*) **(Cont'd)**

	No Risk	**Low Risk**	**Medium Risk**	**High Risk**
Equipment not suitable for the situation	1	2	3	4
Lighting *(e.g. insufficient, too much)*	1	2	3	4

Other, **(please specify):** ____________________

____

(b) Nurse Factors

Age	1	2	3	4
Physical status *(e.g. weight, height)*	1	2	3	4
Fitness level	1	2	3	4
Fatigue level	1	2	3	4
Drug/Alcohol use	1	2	3	4
Knowledge of how to use equipment	1	2	3	4
Knowledge of lifting/transferring technique	1	2	3	4
Assessment prior to task	1	2	3	4
Staff-patient ratio *(e.g. staff shortage)*	1	2	3	4
Work footwear	1	2	3	4
Work clothing *(e.g. it restrict movement)*	1	2	3	4

Other, **(please specify):** ____________________

____

Home Care Nurses' Low-Back Injury Questionnaire

Section I (Cont'd)

2. (c) Client Factors

	No Risk	**Low Risk**	**Medium Risk**	**High Risk**
Weight	1	2	3	4
Height	1	2	3	4
Clothing	1	2	3	4
Fatigue level	1	2	3	4
Mobility and flexibility	1	2	3	4
Muscular dysfunctions	1	2	3	4
Mental awareness	1	2	3	4
Body awareness	1	2	3	4
Coordination	1	2	3	4
Co-operation	1	2	3	4
Emotional status	1	2	3	4
Communication problems	1	2	3	4

Other, **(please specify)**: ______________________________

____

Section I (Cont'd)

3. *Indicate whether you **agree** with, **disagree** with, or are **unsure** of the following statements by circling the appropriate response for each item.*

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
I am informed about how to prevent low-back injuries	1	2	3	4	5
Low-back injuries are related to handling clients	1	2	3	4	5
Lift/transfer devices reduce low-back injuries	1	2	3	4	5
Ongoing education and training reduce low-back injuries	1	2	3	4	5
Pre-employment health assessment reduces low-back injuries	1	2	3	4	5
Fatigue is a risk factor for low-back injuries	1	2	3	4	5
Ergonomic* job design reduces low-back injuries	1	2	3	4	5
Bending knees, keeping back straight, and then lifting with the leg muscles prevent low-back injuries	1	2	3	4	5
Sudden unexpected factors limit the use of proper biomechanical techniques** in preventing low-back injuries	1	2	3	4	5
Physical activities outside of work reduce low-back injuries	1	2	3	4	5
Stress at work or home is a risk factor for low-back injuries	1	2	3	4	5

* ***Ergonomics** is the science of matching the job to the worker and the product to the user.*

** *One example of **biomechanical techniques** is bending your knees and keeping your back straight in lifts.*

SECTION II

4. ***PRIOR to the last 12 months,*** *have you had a work-related low-back injury?*

Yes	1
No	2

5. ***WITHIN the last 12 months,*** *have you had a work-related low-back injury?*

Yes	1	**How Many? _______.**
No	2	**[IF NO, GO TO QUESTION #13]**

6. *Have you reported these low-back injuries to your agency?*

Yes	1	**How Many? _______. [IF YES, GO TO QUESTION #9]**
No	2	**[IF NO, GO TO QUESTIONS #7 and #8]**

7. *Indicate the reason(s) for NOT reporting these low-back injuries.*
(Please circle ALL responses that apply)

Not aware of reporting procedures	1
Fear of being reprimanded or suffering repercussions.........................	2
Embarrassment/personal reasons	3
Red tape involved	4
Effect on safety/sick time record	5
Injury not serious/not important	6

Other, **(please specify)**: ____

____

8. *What were you doing when you had a low-back injury(ies) that you did NOT report?*
(Please circle ALL responses that apply)

Driving a vehicle	1
Lifting a client up in bed	2
Repositioning a client in bed	3
Repositioning a client in wheelchair	4
Transferring a client from wheelchair to bed	5
Transferring a client from bed to wheelchair	6
Transferring a client from toilet to wheelchair	7
Transferring a client from wheelchair to toilet	8
Transferring a client from bathtub to wheelchair	9
Transferring materials to or from vehicle	10
Weighing a client	11
Supporting a falling client	12
Doing a dressing change	13
Doing footcare	14
Walking	15

Other, **(please specify)**: ____

____

Home Care Nurses' Low-Back Injury Questionnaire

Section II (Cont'd)

9. *What were you doing when you had a low-back injury(ies) that you* ***REPORTED****?*
(Please circle ALL responses that apply)

Driving a vehicle	1
Lifting a client up in bed	2
Repositioning a client in bed	3
Repositioning a client in wheelchair	4
Transferring a client from wheelchair to bed	5
Transferring a client from bed to wheelchair	6
Transferring a client from toilet to wheelchair	7
Transferring a client from wheelchair to toilet	8
Transferring a client from bathtub to wheelchair	9
Transferring materials to or from vehicle	10
Weighing a client	11
Supporting a falling client	12
Doing a dressing change	13
Doing footcare	14
Walking	15

Other, (please specify): ____________________

____

10. *Were you using any lift/transfer devices to assist your work when you had a work-related low-back injury?*

Yes	1	**[IF YES, GO TO QUESTION #11]**
No	2	**[IF NO, GO TO QUESTION #12]**

11. *Indicate your reason(s) for why a low-back injury(ies) occurred while using a lift/transfer device.*
(Please circle ALL responses that apply)

Wrong lift/transfer device for the purpose	1
Lift/transfer device poorly maintained/not working properly	2
Lift/transfer device failed	3
Injury occurred in spite of proper use of a functioning of the lift/transfer device	4
Misuse of the lift/transfer device	5
Limited space	6

Other, (please specify): ____________________

____

Section II (Cont'd)

12. *Indicate your reason(s) for* ***NOT*** *using a lift/transfer device.*
(Please circle ALL responses that apply)

Not available	1
Too time consuming	2
Physical effort required	3
Limited space	4
Manual lifting needed afterward, anyway	5
Client refusal to use the device	6
Client safety	7
Lack of skill or experience	8

Other, **(please specify)**: ____________________

____

13. *How often do you use biomechanical techniques for preventing low-back injuries? (e.g. bending your knees and keeping your back straight in lifts; turning your feet rather than twisting your body)*

Always	1
Often	2
Sometimes	3
Never	4

Please explain your response:

____

____

____

____

SECTION III

In answering the next questions, please use the following definition of NEAR-ACCIDENTS/CLOSE CALLS as a reference:

A near-accident/close call is an incident with no noticeable injury or damage.

e.g. When the floor is wet and slippery, a family member of the client catches a home care nurse who is sliding, and thus avoids a fall.

OR

e.g. On the way to visit a client, a home care nurse has a car accident, luckily, with no physical injury.

14. ***WITHIN* the last 12 months,** *how many times have you had a work-related near-accident/close call for a low-back injury?* _______

15. *Where did these near-accidents/close calls happen?* **(Please circle ALL responses that apply)**

At the agency	1
At the client's home	2
On the way to clients' home from agency	3
On the way back to agency from clients' home	4

Other, **(please specify)**: ________________________________

____

16. *Describe the 3 **MOST** serious situation(s) in which **YOU** had a work-related near-accident/close call for low-back injuries in home care.*

1. ________________________________
2. ________________________________
3. ________________________________

17. *Describe 3 **POSSIBLE** situation(s) that could lead to a work-related near-accident/close call for low-back injuries in home care.*

1. ________________________________
2. ________________________________
3. ________________________________

SECTION IV

18. *Are any of the following **RESOURCES** available at your place of employment?* **(Please circle the appropriate response for each item)**

	Yes	No	Unsure
An occupational/employee health nurse	1	2	3
Back injury prevention program	1	2	3
Occupational health and safety program	1	2	3
Joint occupational health and safety committee	1	2	3

Other, **(please specify)**: ____________________

____

19. *Does your employer have a **WRITTEN POLICY or PROCEDURE** for the following topics?* **(Please circle the appropriate response for each item)**

	Yes	No	Unsure
Reporting of back injuries during the day	1	2	3
Reporting of back injuries after day shift or on weekends	1	2	3
Follow-up for the staff member who experiences a back injury	1	2	3
Reporting of near-accidents/close calls	1	2	3
Follow-up for near-accidents/close calls	1	2	3
Safety policies and procedures	1	2	3
Pre-placement health assessment	1	2	3
Occupational health and safety	1	2	3
Return to work following injury	1	2	3
Smoking	1	2	3

Section IV (Cont'd)

20. *Does your employer provide an __ORIENTATION__ for the following topics?*
(Please circle the appropriate response for each item)

	Yes	No	Unsure
Lifting/transferring techniques	1	2	3
Lifting/transferring devices	1	2	3
Reporting procedures for low-back injuries	1	2	3
Reporting of near-accidents/close calls	1	2	3
Driving safety	1	2	3
Back care protection	1	2	3
Medical, disability, dismemberment, and life insurance	1	2	3
Worker's compensation procedures	1	2	3
Occupational health and safety services	1	2	3
Workplace health and safety hazards	1	2	3

21. *Does your employer provide an __ONGOING INSERVICE__ for the following topics?*
(Please circle the appropriate response for each item)

	Yes	No	Unsure
Lifting/transferring techniques	1	2	3
Lifting/transferring devices	1	2	3
Reporting procedures for low-back injuries	1	2	3
Reporting of near-accidents/close calls	1	2	3
Driving safety	1	2	3
Back care protection	1	2	3
Medical, disability, dismemberment, and life insurance	1	2	3
Worker's compensation procedures	1	2	3
Occupational health and safety services	1	2	3
Workplace health and safety hazards	1	2	3

Home Care Nurses' Low-Back Injury Questionnaire

SECTION V

22. *For whom do you work the **MAJORITY** of hours in an average week?*

Private home care agency	1
Government home care agency	2

Other, **(please specify)**: ____________________

____

23. *Do you work in an urban or rural home care setting?*

Rural (< 1,000 population)	1
Urban (≧ 1,000 population)	2
Urban-rural mix	3

24. *Which Alberta health region do you work in?*

Chinook regional health authority	1
Palliser health authority	2
Headwaters health authority	3
Calgary regional health authority	4
Regional health authority #5	5
David Thompson regional health authority	6
East Central regional health authority	7
WestView regional health authority	8
Crossroads regional health authority	9
Capital health authority	10
Aspen regional health authority	11
Lakeland regional health authority	12
Mistahia regional health authority	13
Peace health region	14
Keewestinok Lakes regional health authority	15
Northern Lights regional health authority	16
Northwestern health services region	17

25. What is your highest completed level of education?

Diploma in nursing	1
Bachelor of science in Nursing (Basic)	2
Bachelor of science in Nursing (Post-RN)	3
Masters in Nursing	4
Doctorate in Nursing	5

Other education, **(please specify):** ____________________

____

Section V (Cont'd)

26. *How many years have you been actively practising nursing?*

1 year or less	1
2-5 years	2
6-9 years	3
10-13 years	4
14-17 years	5
18-21 years	6
22 years or more	7

27. *How many years have you been practising in home care?*

1 year or less	1
2-5 years	2
6-9 years	3
10-13 years	4
14-17 years	5
18-21 years	6
22 years or more	7

28. *What CURRENT nursing position do you hold?*

Supervisor	1
Case Coordinator/Case Manager	2
Clinical Specialist	3
Staff Nurse	4
Licensed Practical Nurse/Nursing Aide/Personal Care Attendant	5

Other. **(please specify)**: ______________________________

____

29. *How many hours on average do you work in a week in home care?*

1-5 hours	1
6-10 hours	2
11-15 hours	3
16-20 hours	4
21-25 hours	5
26-30 hours	6
31-35 hours	7
36-40 hours	8
over 40 hours	9

30. *Do you work overtime?*

Yes	1
No	2

How many hours on average per week? ______

Section V (Cont'd)

31. *Rank order the **5 most frequent weekly activities** you do in **Home Care**, by assigning 1 (most frequent) to 5 (least frequent).*

____ Lifting clients
____ Transferring clients
____ Repositioning clients
____ Weighing clients
____ Dressing changes
____ Footcare
____ Teaching clients
____ Charting in car
____ Charting in office/clients' home
____ Driving
____ Intravenous transfusion
____ Medication monitoring
____ Other, **(please specify)**: ______________________________

____

32. *Rank order the **3 most frequent weekly activities** you do **outside your work**, by assigning 1 (most frequent) to 3 (least frequent).*

____ Housework/laundry
____ Shopping
____ Yardwork/Gardening
____ Care of dependent family member(s)
____ Watching T.V.
____ Physical exercise
____ Computer entertainment
____ Walking
____ Sitting
____ Other, **(please specify)**: ______________________________

____

33. *Do you have any of the following medical problems?*

	Yes	**No**
Rheumatoid arthritis	1	2
Diabetes mellitus	1	2
Pre-menstrual syndrome	1	2
Leg-length discrepancy	1	2
Osteoporosis	1	2
Osteoarthritis	1	2
Kyphosis/Scoliosis	1	2
Mental health problem	1	2

Other, **(please specify)**: ______________________________

____

Section V (Cont'd)

34. *Do you exercise at a moderate intensity for 20 minutes at least 3 times a week?*

Yes	1
Occationally	2
No	3

35. *Do you smoke?*

Yes	1
Occationally	2
No	3

36. *Are you satisfied with your current job?*

Very unsatisfied	1
Unsatisfied	2
Somewhat	3
Satisfied	4
Very satisfied	5

37. *Do you consider your job stressful?*

Very stressful	1
Stressful	2
Somewhat	3
Unstressful	4
Very unstressful	5

38. *What is your age?*

18-24 years	1
25-34 years	2
35-44 years	3
45-54 years	4
55-64 years	5
65 and over	6

39. *What is your gender?*

Male	1
Female	2

40. *What is your height?* ____________________

41. *What is your weight?* ____________________

Any additional comments you may wish to make are welcomed and may be included in the space remaining on this page.

____

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE. PLEASE RETURN THIS IN THE ENVELOPE PROVIDED BY **DECEMBER 8, 1995**.

Appendix G

Follow-up Postcard Reminder

REMINDER

Date: December 12, 1995
To: **Home Care Nurses**
Research Study Title: **Low-Back Injuries in Alberta Home Care Nurses**

About three weeks ago, you received the survey that asked home care nurses about low-back injuries. This card is a friendly reminder that your response to the "Low-Back Injuries in Alberta Home Care Nurses" survey would be very much appreciated. *If you have completed the survey and returned it as requested, we thank you for your cooperation.*

If, however, you have not had the opportunity to complete the questionnaire, we invite you to do so as soon as possible. Please return the questionnaire as requested. If the survey has been misplaced, please contact the AARN at 451-0043 and another questionnaire will be mailed to you.

Any questions or concerns you might have about the research study may be directed to either of the following:

Kin Cheung, MN Candidate
#5, 10825-86 Ave
Edmonton, AB
T6E 2N1
433-0192

Dr. Lynn Skillen, PhD, RN
Associate Professor
Faculty of Nursing
University of Alberta
Edmonton, AB
T6G 2G3
492-2648

Appendix H

Authorization Access

Manager of Occupational Health and Safety

Capital Health Authority,

University Hospital Site

university
of Alberta
hospitals

Walter C. Mackenzie
Health Sciences
Centre

Aberhart Centre

University Hospitals
Education and
Development Centre

University Hospitals
Outpatient Residence

University Hospitals
Patient Support
Centre

8440 - 112 Street, Edmonton, Alberta, Canada, T6G 2B7 Tel. (403) 492-8822

June 14, 1995

Miss Kin Cheung,
#5, 10825 - 86 Avenue,
Edmonton, AB T6E 2N1

Dear Miss Cheung,

You are given permission to use and modify the University of Alberta Hospital Back Injury Prevention Program Risk Analysis Tool (Back Injury Risk Factor Audit and Patient Assessment Form). This tool was developed by a subcommittee of the U of A Hospital Back Injury Prevention Task Force. A pilot study was conducted using the tool in January/February 1993.

Sincerely,

Bernadette Bolcic

Bernadette Bolcic, B.P.T.
Physical Therapist,
Occupational Health & Safety,
Capital Health Authority - University Hospital Site,
1-198 CSB,
8440 - 112 Street,
Edmonton, AB T6G 2B7

C Clark

Caroline Clark,
Manager,
Occupational Health & Safety,
Capital Health Authority - University Hospital Site,
1-198 CSB,
8440 - 112 Street,
Edmonton, AB T6G 2B7

Appendix I

Authorization Access

Client Service Manager, Capital Health Authority, Home Care

Capital Health Authority
Home Care

1995 06 15

Kin Cheung, RN, MN Candidate
#5, 10825-86 Ave
Edmonton, Alberta
T6E 2N1

Dear Ms. Cheung;

Re: Access to Home Care Staff Nurses

Based on the receipt of ethical approval from the University of Alberta Joint Ethics Review Committee, I would be pleased to grant your request to access ten Home Care Nursing staff of NE Network (Kingsway Home Care Office). Please forward evidence of ethical approval when it is received.

Following receipt of a description of the pilot study, Home Care Nurses may be accessed by the researcher to participation a voluntary basis, in confidence, for completion of the questionnaire.

We would like to receive a copy of the final questionnaire and a copy of your study when it is complete.

Tentative arrangements have been made for staff to meet with you on Tuesday, July 18 in this office to discuss the pilot study.

Yours truly,

Carol E Sims

Carol Sims
Client Service Manager

f:\csims\cheung

Appendix J

Authorization Access

Staff Coordinator, Edmonton Medical Registry

EDMONTON MEDICAL REGISTRY
1100 MIDLAND WALWYN TOWER
EDMONTON CENTRE
EDMONTON, ALBERTA T5J 2Z2
TELEPHONE (403) 424-2867
FAX (403) 425-5984

June 16, 1995

Kin Cheung, RN, MN Candidate
#5, 10825-86 Ave
Edmonton, Alberta
T6E 2N1

Dear Ms. Cheung,

RE: Access to Home Care Nurses

Based on the receipt of ethical approval from the University of Alberta Joint Ethics Review Committee, I would be pleased to grant your request to access five Home Care Registered Nurses of Edmonton Medical Registry for your pilot study. Home Care Nurses may be accessed by the researcher to participate in a voluntary basis for completion of the questionnaire. Please forward evidence of ethical approval when it is received.

Yours truly,

Cathy Kirbyson

Cathy Kirby, RN
Staff Coordinator

Appendix K

Ethical Approval

Joint Ethics Review Committee

Faculty of Nursing

University of Alberta

University of Alberta
Edmonton
Canada T6G 2G3

Faculty of Nursing
3rd Floor Clinical Sciences Building

Certification of Ethical Acceptability for Research Involving Human Subjects

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NAME OF APPLICANT(S): Kin Cheung, RN, BScN, MN Candidate

TITLE OF PROJECT: "Low-back Injuries in Alberta Home Care Nurses"

The members of the review committee, having examined the application for the above-named project, consider the procedures, as outlined by the applicant, to be acceptable on ethical grounds for research involving human subjects.

June 26, 1995
Date

M. Ruth Elliott
M. Ruth Elliott, RN, PhD
Chair
Ethics Review Committee

The Ethics Review Committee is a Joint Committee of
The Faculty of Nursing, University of Alberta
and the University of Alberta Hospitals